**SYNOPSIS**

ON

**“SMART ATTENDANCE SYSTEM”**

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**ABSTRACT:**

The main purpose of this project is to build a Smart attendance system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Many problems arise when the authority is unable to enforce the regulation that exist in the old system. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a excel sheet. At the end of the day, the excel sheet containing attendance information regarding all individuals are mailed to the respective faculty.

**Keywords**- Smart Attendance System, SVM, CNN, OpenCV,Numpy, Mangodb., Deep learning.

1. **Introduction**

Student attendance is taken manually through the use of attendance sheets issued by department heads as part of the legislation in most learning institutions. In these sheets, students sign up for future study, which is then filled in or signed on to a computer manually. This approach is slow, time-consuming and inconsistent as some students often sign for their missing colleagues. It also makes it difficult to track the attendance of individual students in a large classroom setting. In our work, we propose the design and implementation of a face detection and recognition system to automatically detect students attending a lecture in the classroom and recognize their attendance by recognizing their faces. While other methods of biometric authentication may be more reliable, students usually have to queue for a long time when they enter the classroom. Because of its non-intrusive nature and familiarity, face recognition is chosen because people recognize other people primarily based on their facial characteristics. The biometric (facial) system consists of and

**1.1 Problem Statement and** **Motivation**

According to the previous attendance management system, the accuracy of the datacollected is the biggest issue. This is because the attendance might not be recorded personally by the original person, in another word, the attendance of a particular person can be taken by a third party without the realization of the institution which violates the accuracy of the data. For example, student A is lazy to attend a particular class, so student B helped him/her to sign for the attendance which in fact student A didn‟t attend the class, but the system overlooked this matter due to no enforcement practiced. Supposing the institution establish an enforcement, it might need to waste a lot of human resource and time which in turn will not be practical at all. Thus, all the recorded attendance in the previous system is not reliable for analysis usage. The second problem of the previous system is where it is too time consuming. Assuming the time taken for a student to sign his/her attendance on a 3-4 paged name list is approximately 1 minute. In 1 hour, only approximately 60 students can sign their attendance which is obviously inefficient and time consuming. The third issue is with the accessibility of those information by the legitimate concerned party. For an example, most of the parents are very concerned to track their child‟s actual whereabouts to ensure their kid really attend the classes in college/school. However in the previous system, there are no ways for the parents to access such information. Therefore, evolution is needed to be done to the previous system to improve efficiency, data accuracy and provides accessibility to the information for those legitimate party.

**1.2 Research Objectives**

In order to solve the drawbacks of the previous system stated in 1.1, the existing system will need to evolve. The proposed system will reduce the paperwork where attendance will no longer involve any manual recording. The new system will also reduce the total time needed to do attendance recording. The new system will acquire individual attendance by means of facial recognition to secure data accuracy of the attendance. The following are objectives of the project: ▪ To develop a portable Smart Attendance System which is handy and self-powered. ▪ To ensure the speed of the attendance recording process is faster than the previous system which can go as fast as approximately 3 second for each student. ▪ Have enough memory space to store the database. ▪Able to recognize the face of an individual accurately based on the face database. ▪ Allow parents to track their child‟s attendance. ▪ Develop a database for the attendance management system. ▪ Provide a user-friendly interface for admins to access the attendance database andfor non-admins (parents) to check their child‟s attendance by mailing the attendance. ▪ Allow new students or staff to store their faces in the database by using a GUI. ▪ Able to show an indication to the user whether the face- recognition process is successful or not

**1.3 Impact, Significance and contributions**

Many attendance management systems that exist nowadays are lack of efficiency and information sharing. Therefore, in this project, those limitations will be overcome and also further improved and are as follows : ▪ Students will be more punctual on attending classes. This is due to the attendance of student can only be taken personally where any absentees will be noticed byte system. This can not only train the student to be punctual as well as avoids any immoral ethics such as signing the attendance for their friends. ▪ The institution can save a lot of resources as enforcement are now done by means of technology rather than human supervision which will waste a lot of human resource for an insignificant process. ▪ The application can operate on any device at any location as long as there is Wi-Fi coverage or Ethernet connection which makes the attendance system to be portable to be placed at any intended location. For an example, the device can be placed at the entrance of the classroom to take the attendance. ▪ It saves a lot of cost in the sense that it had eliminated the paperwork completely. ▪ The system is also time effective because all calculations are all automated. In short, the project is developed to solve the existing issues in the old attendance system

**II. LITERATURE**

**2.1 Attendance System Using NFC Technology** with Embedded Camera on Mobile Device According to research journal “Attendance System Using NFC (Near Field Communication) Technology with Embedded Camera on Mobile Device” (Bhise, Khichi, Korde,Lokare, 2015). The attendance system is improved by using NFCtechnology and mobile application. According to the research paper, each student is given a NFC tag that has a unique ID during their enrolment into the college. Attendance of each class will then be taken by touching or moving these tags on the lecturer mobile phone. The embedded camera on the phone will then capture the student‟s face to send all the data to the college server to do validation and verification. The advantages of this method is where the NFC is simple to use, and the speed of connection establishment is very high. It indeed speeds up the attendance taking process a lot. However, this system couldn‟t automatically spot the violation when the NFC tag is not personally tagged by the original owner. Apart from that, the convenience of the system which uses the mobile phone as the NFC reader was actually an inconvenience to the lecturer. Imagine if the lecturer had forgotten to bring their mobile phones to work, what would be the backup procedure for the attendance to be recorded? Moreover, most of the lecturer will not likely to prefer their personal smart phones to be used in this way due to privacy matter. Hence, unique information about the student like biometrics or face recognition, which is guanine for a student should be used in replacement of the NFC tag. This will ensure attendance to be taken originally by the actual student.

**2.2 Face Recognition Based Attendance Marking System**

The second research journals “Face Recognition Based Attendance Marking System” (SenthamilSelvi, Chitrakala, Antony Jenitha, 2014) is based on the identification of face recognition to solve the previous attendance system‟s issues. This system uses camera to capture the images of the employee to do face detection and recognition. The captured image is compared one by one with the face database to search for the worker‟s face where attendance will be marked when a result is found in the face database. The main advantage of this system is where attendance is marked on the server which is highly secure where no one can mark the attendance of other. Moreover, in this proposed system, the face detection algorithm is improved by using the skin classification technique to increase the accuracy of the detection process. Although more efforts are invested in the accuracy of the face detection algorithm, the system is yet not portable. This system requires a standalone computer which will need a constant power supply that makes it not portable. This type of system is only suitable for marking staff‟s attendance as they only need to report their presence once a day, unlike students which require to report their attendance at every class on a particular day, it will be inconvenient if the attendance marking system is not portable. Thus, to solve this issue, the whole attendance management system can be developed on an portable module so that it can be work just by executing the python program.

**2.3 Fingerprint Based Attendance System Using Microcontroller and LabView**

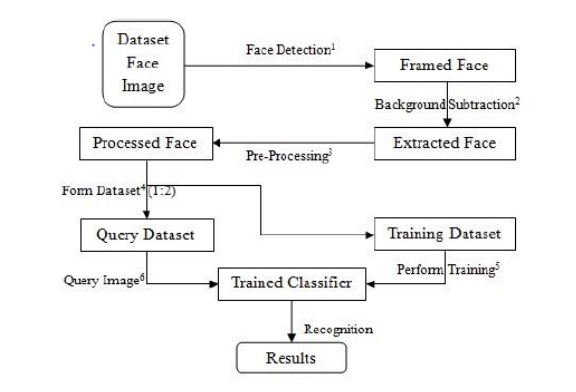
The third research journal “Fingerprint Based Attendance System Using Microcontroller and LabView” (Kumar Yadav, Singh, Pujari, Mishra, 2015) proposed a solution of using fingerprint to mark the attendance. This system is using 2 microcontrollers to deal with the fingerprint recognition process. Firstly, the fingerprint pattern will be obtained through a fingerprint sensor, then the information will be transmitted to microcontroller 1. Next microcontroller 1 will pass the information to microcontroller 2 to do the checking with the database that resides in it. After finding a student‟s match, the details are sent to the PC through serial communication to be displayed. This design is good as it accelerates development while maintaining design flexibility and simplifies testing. But again, this system is attached to a PC which make it not portable. Other than that, the database information cannot be accessible easily. Meaning that, for the parents whom are interested in knowing their child‟s attendance cannot easily or conveniently access the information. Therefore, to provide accessibility of the student‟s information to the legitimate concerned party, the information can be uploaded to a web server for easy access. While the authentication for the appropriate access can be enforced through a login screen.

**2.4 RFID based Student Attendance System**

According to the fourth research journal “RFID based Student Attendance System” (Hussain, Dugar, Deka, Hannan, 2014), the proposed solution is almost similar to the first research journal where RFID technology is used to improve the older attendance system. In this system, a tag and a reader is again used as a method of tracking the attendance of the students. The difference between the first journals with this is where attendance‟s information can be accessed through a web portal. It provides more convenient for information retrieval. Again, this system is imperfect in the sense that, firstly, it is not portable, as the RFID reader can only work when it is connected to a PC. Secondly, the RFID tag is not a guanine information that can uniquely identify a student, thus, resulting in the inaccuracy of the collected attendance information.

1. **Problem formulation**

At the moment, most of the attendance systems that are being used in universities still are written a piece of paper. For classes, tutorial and laboratory session the student still have to sign the signature on the attendance sheet. This method is not flexible because the risk of losing the attendance data is very high. If the attendance sheet is missing, the attendance data will be lost. Other than that, unethical problem may be occurring such as cheating in signature. For example, a student does not attend his class but his attendance form has been signed by other student. This system is proposed to overcome these problems. Besides that, since the proposed system also record the time, the lecturer can monitor the punctuality of the students too.



1. **OBJECTIVE**

Use of face recognition for the purpose of attendance marking is the smart way of attendance management system. Face recognition is more accurate and faster technique among other techniques and reduces chance of proxy attendance. Face recognition provide passive identification that is a person which is to be identified does not to need to take any action for its identity . Face recognition involves two steps, first step involves the detection of faces and second step consist of identification of those detected face images with the existing database. There are number of face detection and recognition methods introduced. Face recognition works either in form of appearance based which covers the features of whole face or feature based which covers the geometric feature like eyes, nose, eye brows, and cheeks to recognize the face **.**

1. **Methodology/ Planning of work**

**5.1 Data Acquisition**

**5.1.1 Image acquisition**: Image is acquire using a high definition camera which is placed in the classroom. This image is given as an input to the system.

**5.1.2 Dataset Creation:** Dataset of students is created before the recognition process. Dataset was created only to train this system. We have created a dataset of 5 students which involves their name, roll number, department and images of student in different poses and variations. For better accuracy minimum 15 images of each students should be captured. Whenever we register student’s data and images in our system to create dataset, deep learning applies to each face to compute 128-d facial features and store in student face data file to recall that face in recognition process. This process is applies to each image taken during registration.

**5.1.3 Storing:** We shall used Mangodb to store the student’s data

Face Detection and Extraction: Face detection is important as the image taken through the camera given to the system, face detection algorithm applies to identify the human faces in that image, the number of image processing algorithms are introduce to detect faces in an images and also the location of that detected faces

**2 Face Positioning:** There are 68 specific points in a human face. In other words we can say 68 face landmarks. The main function of this step is to detect landmarks of faces and to position the image. A python script is used to automatically detect the face landmarks and to position the face as much as possible without distorting the image.

**Hardware and software required:**

* **Hardware Required**

1. **Laptop/desktop**
2. **Camera**
3. **4GB RAM or More**
4. **I3 processor**
5. **250 SSD /HDD**

* **Softwares required**

1. **Python 3.9**
2. **Winows 10 or Update**
3. **VS code**
4. **OpenCv**
5. **Numpy**
6. **MangoDB**

**Conclusion**

Smart attendance system is designed to solve the issues of existing manual systems. We have used face recognition concept to mark the attendance of student and make the system better. The system performs satisfactory in different poses and variations. In future this system need be improved because these system sometimes fails to recognize students from some distance, also we have some processing limitation, working with a system of high processing may result even better performance of this systemREFERENCES:

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