FACE DETECTION FOR ATTENDANCE SYSTEM USING MACHINE LEARNING

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Abstract - *The use of real-time facial recognition technology in an attendance system is a solution that helps with the day-to-day tasks of managing student attendance. The technique of recognizing a student's face and recording their attendance using facial biometrics is known as face recognition-based attendance. The major goal of this project is to develop a facial recognition-based attendance system for educational institutions in order to improve and enhance the current attendance system to make it more efficient and effective than previously. For this system we have used the haar cascade classifier and LBPH method for recognition and MySQL as database language.*

Key Words: **LBPH- local binary pattern histogram, NFC-Near Field Communication, RFID-Radio Frequency Identification, etc.**

1. INTRODUCTION

In this study, we suggested a system for marking students' attendance in educational institutions using face recognition technology. According to the present system, which is a manual attendance management system, the system's accuracy was the main problem. This is because the original person may not have personally recorded the attendance. The existing system's second flaw is that it is time demanding.

The suggested technology will save paper work by eliminating the need for manual attendance recording. The new method will also cut down on the amount of time it takes to register attendance. Facial recognition is a technology that can recognize a person only by looking at them. It uses machine learning techniques to detect, collect, store, and analyze facial traits so that they can be matched to photographs of people in a database. Face detection, face alignment, feature extraction, face recognition, and face verification are all part of this procedure.

2. REVIEW OF LITERATURE

2.1 Attendance System with Embedded Camera on Mobile Device Using NFC Technology.(Bhise, Khichi, Korde,Lokare, 2015)

According to the study journal "Attendance System Using NFC Technology with Embedded Camera on Mobile Device", the use of Near Field Communication (NFC) technology and a mobile application improves the attendance system. During their enrolment into the college, each student is given an NFC tag with a unique ID, according to the research article. The lecturer's cell phone will subsequently be used to track attendance for each lesson by tapping or repositioning these tags. The phone's embedded camera will then capture the student's face, allowing all of the data to be sent to the college server for confirmation and verification.

2.2 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 is 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 guanine information that can uniquely identify a student, thus, resulting in the inaccuracy of the collected attendance information.

2.3 Fingerprint based Attendance System for Educational Institutes (Alhothaily, Alradaey, Oqbah, Amin,2015)

The fingerprint attendance system for Educational Institutes module R305 is a fingerprint scanner that captures photographs of the finger, according to this research article. It's also used to convert photos to templates and save them for later usage. A microcontroller called ATMEGA328 is also included on the main board. This microcontroller is from ATMEL's microcontroller line. It's a system that connects a fingerprint reader to other systems. It features a wide number of peripherals and can store the date and time as well as the attendance data. For communication with the management server, the chips SN75176 and MAX232 are employed. In addition, the system can assess the student's attendance on a web page, either in summary or in depth, for guardians.

3. METHODOLOGY

The proposed technology is based on face recognition. When a student comes through the camera module, the image of that student is collected and validated. When the recognition and validation processes are completed, his or her attendance will be immediately recorded. To demonstrate this system, we built a model of it using a device camera. In order to use it, we must connect it to a camera module that we coded independently.

3.1. Process Description

1. Generating a Dataset: The photos of pupils will be recorded in a dataset together with their information such as class, division, and year.
2. Image Processing: In order to improve the quality of the image and the accuracy of image identification, pre-processing is required. For picture processing, we employed the colour to grey image conversion approach.
3. Data set for training: During the training phase, we must use an algorithm to determine which image belongs to which person. When a camera detects a face, it uses the training set to recognise it.
4. Face Recognition: A camera will be positioned at the entrance to capture excellent photographs of the students' faces. When a student's face is captured by the camera system, an automatic recognition procedure begins, which will identify and authenticate the student.
5. Attendance Marking: When a face from the image dataset is matched with an image acquired by the camera, the student will be registered as present in attendance.

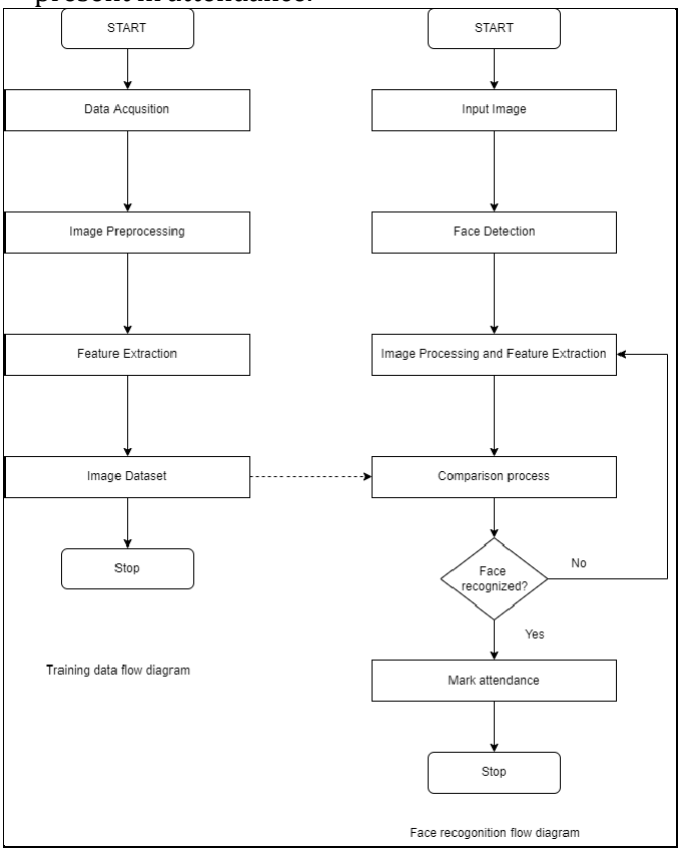

Fig -1: FLOWCHART

3.2. Haar Cascade classifier – for Face detection

The Haar Cascade classifier was proposed by Paul Viola and Michael Jones as an effective object detection approach. This method is based on machine learning. The positive and negative pictures are then analysed using a cascade approach. It will use this to detect items in other photos. Without faces to evaluate, a face detection algorithm will be used, which will require a large number of positive and negative face photos. A different form of haar feature is one that analyses the features on the image. Each action subtracts the sum of white region pixels from the sum of black region pixels from the image of a 24X24 window, resulting in an integer number. The validation of the associated feature is determined by this.

3.3. Local binary pattern histogram – for face recognition

This programme generates a new histogram for the given input image and compares it to other created histograms. The comparison returns the label of the histogram that is connected with the best match histogram. For the histogram faces recognition, a 3X3 window is used to move one image, with the centre pixel comparing itself to its neighbours with each motion of each local region of the image. 1 indicates that the intensity value of the neighbouring pixels is less than or equal to that of the centre pixel, and 0 indicates that the intensity value of the other pixels is less than or equal to that of the centre pixel. Then, in the 3X3 window, read values 0 or 1 in clockwise order to get a binary pattern like 11000011, which is local to a certain part of the image.

4. RESULT AND DISCUSSION

For this system we created a GUI and the process starts with updating student information into the database.

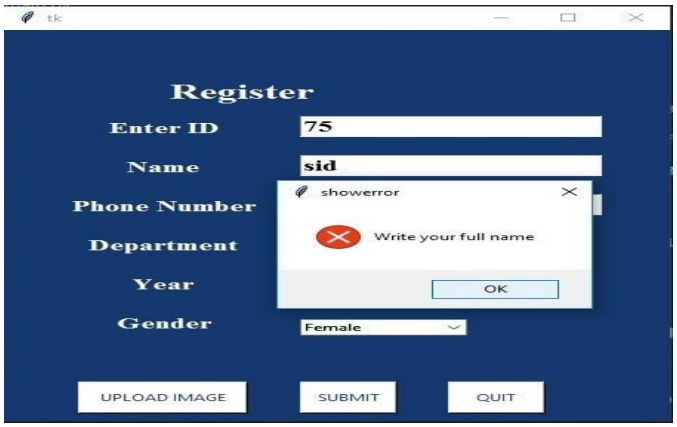

Fig -2 : GUI for inserting student detail

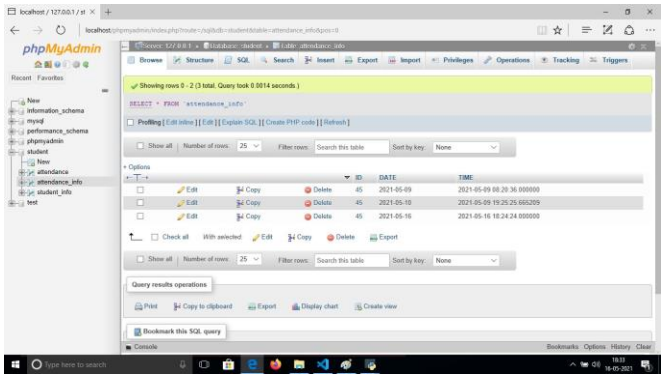

Fig -3 : Database to store student data

After that image processing is done and processed data goes for training dataset

Fig - 4: Capturing image of student

Fig -5: Image Processing

Once training of the dataset is done, the system is ready for testing, if any student comes in front of the camera he/she will get recognized and his/her attendance will get marked, if an unknown person comes in front of the camera, his/her captured image will get stored in an unknown folder.

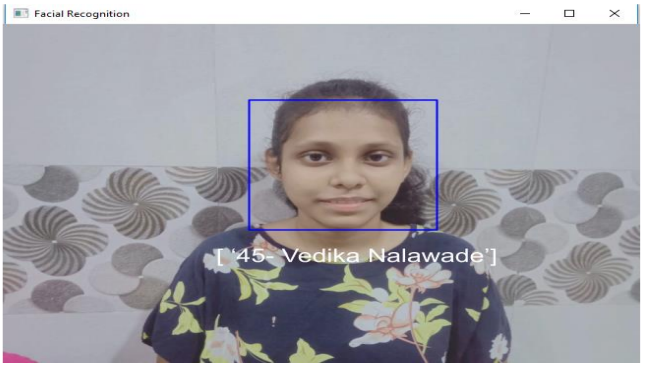

Fig -6 : Face recognition

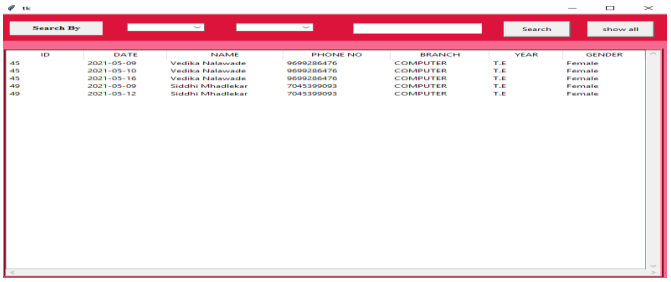

Fig -7: Attendance marking

5. CONCLUSIONS

Thus we proposed a real time system which is able to mark attendance of students after its face gets recognized by the system. The purpose of this project is to replace the manual marking system with an attendance system based on face recognition which is more accurate and less time consuming. It will fill drawbacks of manual systems such as proxy cases and time consuming , paper work.

REFERENCES

[1] Face Recognition Based Attendance Marking System" (SenthamilSelvi, Chitrakala, Antony Jenitha, 2014)

[2] Fingerprint Attendance System for Educational Institutes (Alhothaily, Alradaey, Oqbah, Amin, 2015)

[3] Shubhobrata Bhattacharya, Gowtham Sandeep Nainala, Prosenjit Das and AurobindaRoutray, Smart Attendance Monitoring System : A Face Recognition based Attendance System for Classroom Environment, 2018 IEEE 18th International Conference on Advanced Learning Technologies, pages 358-360,2018.

[4] Arun Katara, Mr. Sudesh, V.Kolhe, Attendance System using Face Recognition and Class Monitoring System, IJRITCC, Volume: 5,Issues: 2 ,February 2017.

[5] Ashish Choudhary, Abhishek Tripathi, Abhishek Bajaj, Mudit Rathi, and B.M Nandini, "Automatic Attendance System Using Face Recognition", International Journal of Modern Trends in Engineering and Research , Volume: 03, Issue: 04, ISSN (Online):23499745; ISSN (Print):2393-8161,April 2016.

[6] K. Mohamed and C. Raghu, "Fingerprint attendance system for classroom needs," inIndia Conference (INDICON), 2012 Annual IEEE. IEEE, 2012, pp. 433–438

[7] T. Lim, S. Sim, and M. Mansor, "Rfid based attendance system,"inIndustrial Electronics & Applications, 2009. ISIEA 2009.IEEE Symposium on, vol. 2. IEEE, 2009, pp. 778–782.

[8] Kadry and K. Smaili, "A design and implementation of awireless iris recognition attendance management system,"Infor-mation Technology andcontrol, vol. 36, no. 3, pp. 323–329, 2007.

[9] T.A.P.K.P.M.I.M.P.A.W.G.D.P.. Roshan-Tharanga, S. M. S. C. Samarakoon, "Smart attendance using real time face recognition," 2013.

[10] P. Viola and M. J. Jones, "Robust real-time face detection,"International journal of computer vision, vol. 57, no. 2, pp. 137–154, 2004.