STUDENTS ATTENDANCE MANAGEMENT SYSTEM BASED ON FACE RECOGNITION

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ABSTRACT—Verification is a main concern with computer-based systems. Face recognition is commonly often used in many applications like protection device and door lock. Universities, Colleges, schools and library attendance are compulsory for every student. Current attendance approach is lecturer calling the roll number and name of the student and then marking attendance on a paper. It's waste of time for everyone. Verification of everystudentinalargeclassroomisquitedifficult.Weuse automated attendance management system to prevent such failures. The paper explains how to use facial recognition to mark student's attendance. In our system introduce the attendance management system for face recognition. Our system will store student's face images into database and then mark automatically attendance of students after this save the result in database. The attendance will be stored according to date and time. There are five main point in this system :(1) first of all student will login with username and password. (2) After this student will be able to mark automatic attendance thought face recognition (image already stored in database). (3) Lecture will be login (4) Lecturer can allow students for attendance, view attendance (5) Admin after login can register the students, store images of students into database and train themodel.

Keywords— Automatic attendance, faces recognition, database, manually mark attendance, model train._____

I. INTRODUCTION

There is significant current interest in creating an automated framework for fast and accurate recognition ofan individual's identity. Computer recognition of human face usesanon-intrusiveandpossiblythemostnormalwayof recognizing people. Using multiple user identification Methods that are based on certain physiological features (such as fingerprints, eye and retina patterns, such face recognition systems are being evaluated: hand topology and audio). Mostly, they depend on the participants'cooperation. The first efforts at using face recognition started with an automated program in 1960's. e Points were created to recognize the main features on images; it used face features suchasears,eyes,noses,andlips.Fromsuchmarksdistances and ratios also were calculated to a common destination and comparedwithdatasets.Anothertechniquethatattemptsto recognize the face features by integrating movements and recognizing points. But the issue is that to achieve reasonable precision, this technique requires a large number of training faces.(Fischler&Elschlager, 1973) methods to measure various features of the face and model them all it onto global template that observed that such features did not contain sufficientdifferentdatatoreflectahumanface.

In (Krishnan et al., 2015)"Automated Face Recognition Assistance System implementation," an automated attendance system for the purpose of eliminating errors occurring in standard (traditional) automatic attendance management systemwasenvisaged. System goal is to automatic and render program, including an organization that is helpful to the institute.

In (D. Nithya, 2015) The first totally automated system to be established used deep learning in very general terms. It contrasted faces with a generic face image with viable approach a produced a collection of patters related to this pattern for an image. This approach is primarily empirical and focuses on linear regressions and the value of the gray image. (Agarwal et al., 2019) developed a system of 21 qualitative markers like hair colour and lip size and shape in the early 1970s.

II. COMPUTERIZED STUDENT ATTENDANCE SYSTEM

Literature review automatic attendance management system-based face recognition. Student attendance is mark by face recognition. There are many systems has been developed for attendance like Bluetooth system, Biometric system, RFID card use for attendance system, but these systems have some

deficiencies. Presenting the latest research paper reviewed (Wkh et al., 2017), (Lukas et al., 2016), (Mehta, 2016), (Jayant, 2016), (Khatun et al., 2015), (Wagh, n.d.).
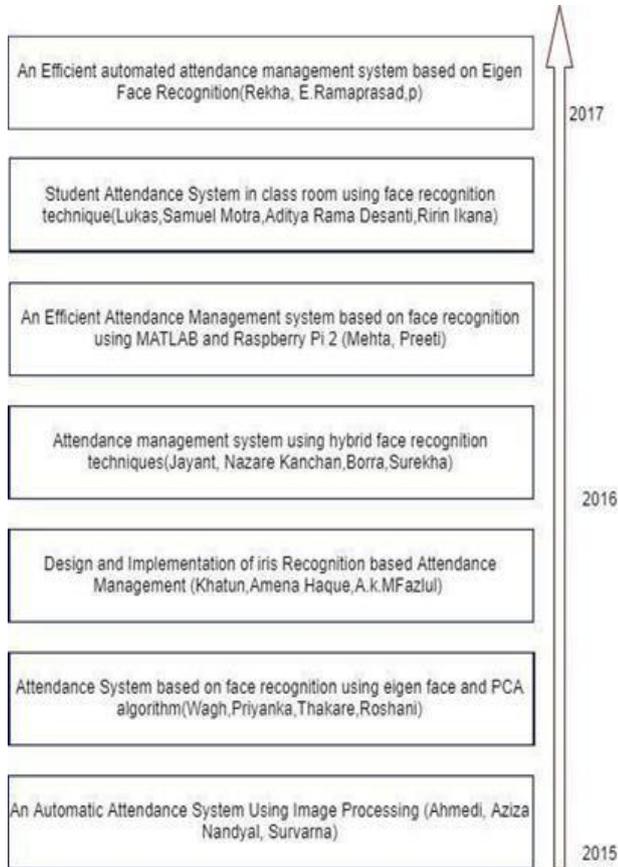

FIGURE1: EVALUATION OF STUDENTAUTOMATIC ATTENDANCE MANAGEMENT SYSTEM BASED ON FACE RECOGNITION

In (Kawaguchi et al., n.d.), Kawaguchi introduces a method of lecture attendance system with the latest technique known as constant detection, the attendance of the students being automatically identified with camera that capture a student's image in class. System features Easy design with only 2 cameras fixed on the wall of class. Initial camera is In the classroom, used to detect the pupil image, and the second camera is a detector camera for recording a student's position inside the classroom, and capture camera captures studentimage.Systemnowmatchesanimagetakenfrom camera and pictures saved in database. This approach is commonly performed to complete a process of mark the attendance.

In (Shehu&Dika, 2014),Introduces computer vision algorithm in real- time automated based attendance system. The device makes nonintrusive use of cameras capable of capture image in classroom, and compares the extract face within device from the capture image store in database. This framework uses an algorithm for AIwhichiscommonlyutilized in PCvision. Moreover, Haar Classifier is utilized to prepare the camera pictures. Face captured by cameras was then transferred to gray scale, and the image was subtracted. The images that were saved for further processing onserver

In (Lodha et al., 2015), Built integrated attendance management system using the technique of facial recognition as the PCA. Frame workuse2 Open CV libraries, a PC vision library, and the FLTK (light toolbox). Libraries aid device growth, such as supporting Open CV algorithm and FLTK

In (Khatunetal. 2015), is used for interface design. There are two steps in this technique, specifically demand coordinating and adding new face to information base. In comparing inquiries, first process is to open camera and capture image, and then remove the face from the image. Next process is to identify face with training data, and project extract face onto the visualization of the main variable. The final move is to reveal the face closely matching the picture you have acquired. Meanwhile, with capturing the picture, added new face into the database methods is initiated, and then face is extract into the image. To locate the object in an image in specific sliding windows, the Haar cascade method is then executed onto the image.

In (Munigala et al., 2019), the author also suggests a method using facial recognition to introduce automatic attendance. Making use of MATLAB with PCA the device will isolate the image in face as like mouth and nose. The method

In (Ezema et al., 2019),intendedto address problems such as Time consuming attendance problemmarkingmethod. The results of the study show that the device can identify facial expressions in classroom'sblackbackdropor differing faceview.

In (Bhagat et al., 2015), Propose an intelligent attendance marking method incorporating two separate algorithms PCA and ANN. Study is capable of resolving conventional marking attendance scheme and the time consumingproblem. The PCA extracts as well as describes likenesses between facial datasets with pictures acquired in the method. In the meantime,

artificial neural network is utilized to solve the issue, or to recognize from data input and average value.Even this framework uses the combinationof mathematical function with backpropagationalgorithm. Result indicates machine also capable of identifying faces with differentsetting.

(Hoo & Ibrahim, 2019), Propose a system using Design Eigenface and key component analysis as follows. In the front, the camera is mounted and used to record the students' full face within the class. So the pictures taken are converted as inputs inside the framework. Images taken from camera may be too bright or too dark, so they need improvement to turn them into gray images. In next phase normalization of histograms is used to eliminate image gap, so it's simple to identify that median filter used to make noise removal of images. Noise also happens often still as using a HD camera.

In Student automatic attendance management systembased face recognition is technology free system no needs expensive system marking the student attendance. Here the system is purposed that attendance is mark on the base of student face either student face is match with already save data indatabase then attendance is mark otherwise it show empty. Student in which student can login by user name and password. Student click mark attendance teacher have option that teacher can do enable and disable. Teacher can enable by clicking enableand allow the student for mark the attendance. Students click automatic attendance for mark the attendance then write the subject name. Camera from laptop screen appears for student facerecognize.

III. ASSMENT OF DIFFERENT ATTENDANCE MANGEMENT FRAMEWIRK

Recognition and detection system based fingerprint:

A portable fingerprint computer must be installed with the student fingerprint earlier in the Fingerprint-based current attendance framework. The student needs to record the fingerprint on an installed computer later, during or after the lecture times or before, to guarantee their enrolment for each day. The issue with this method is it could disrupt the students' attention during the lecture period.
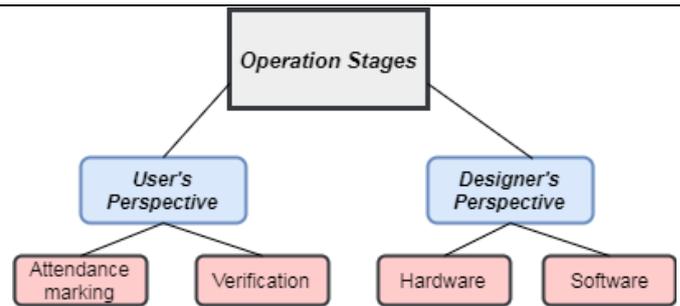

FIGURE 2: FINGERPRINT BASED SYSTEM

NFCbasedAutomaticAttendanceSystem:

NFC-based system simplify various daily living things by touching static or embedded object with both the Or code. Smart Touch, for example, is one of the initial NFC applications focusing on Wireless technologies controlled by VTT Technical Research Centre Finland; applications have been developed under this task in various systems such as information payment and issuing tickets of glucosemeter.

Based on Iris Attendance System:

The student has to stand at the front of an image sensor in the Iris based student attendance scheme, so that the camera can scan the student's Iris. A scanned retina is aligned with student information stored, and their attendance needs are changed. This tends to reduce the workload of both the faculty member of the institute's pen and paper. It also decreases the chances of proxy with in classroom, and helps to keep student records secure. It is really a biometric wireless technique which solves the spurious attendance problem and the problem of setting down their corresponding network.

FIGURE 3: FINGERPRINT BASED SYSTEM
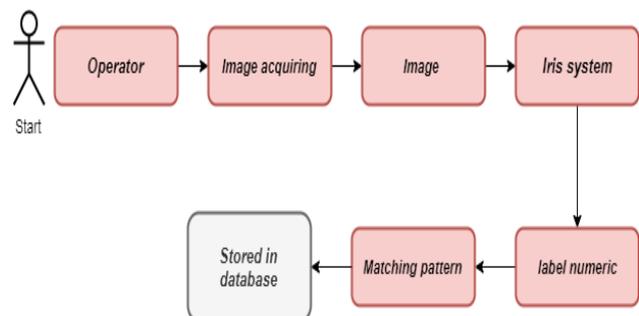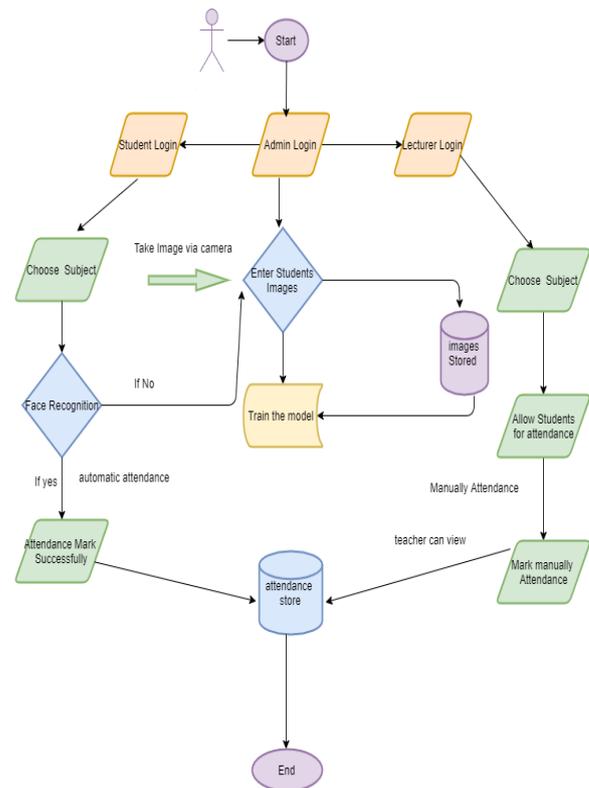

RFIDbasedAttendanceSystem:

The student intends to bring a Radio Frequency Identification Card with them through the RFID based current system and

place that ID on a fingerprint scanner to record its attendance for a day. The machine will connect through RS232 which record its existence of the saved database. There are opportunities that may exist for fraudulent entry. Some students may use the ID of many other students to ensure their attendance if the student is not present in the class or they sometimes even try to abuse it.

Automatic Attendance Marking:

Data model is trained. Aftertrainingthedatasetdataisstoreindatabase.Studentdata store with name, id and subject. If student recognize face match with already store database then mark the attendance if face not match with already store data then it shows empty. First of all student will choose subject after this *"cv2.face.LBHFaceRecognizer()"* will perform their work and recognize the student image after this will classify the image with stored images. If will match date and time method

willputtheattendancewithdateandtimeandnowattendance mark successfully.

IV. PROPOSED APPROACHSTUDENTS ATTENDANCE SYSTEM

System in which we have student, lecturer, admin button student has automaticattendancethatstudentcanchoosetheirsubjectand when student click mark the attendance if teacher allow the student for mark attendance then student can mark if teacher not allow the student for mark attendance then student cannot mark the student, because teacher have enabled and disable buttonandallowthestudenttomarkattendance.Inthissystem admin can enter student name, Enrolment, subject already saves. Here model is trained that consist of student images, name and roll number etc. when student click automatic attendance then she/he write the subject name then itsface.Objectivethis project includes develop of a devicethatmarks student attendance that is based on the face recognition. Necessary results to achieve the objectives are. Recognitionwillstartthroughcamera,facethatalreadystore in database it compares the face, if face is recognizing with already store data base then show face recognition student

name Enrollment, appear with student image. Admin save the student data in database with student name and Enrollment, it shows mark attendance. Either student data is alreadystoring his/herfaceisnotmatchalreadystoreimagesindatabasethen it shows empty.

FIGURE 4: PROCESS OF PROPOSED SYSTEM

These python modules are used to develop and design system: OpenCV, numpy, pillow, tkinter, os, SQLite Date bank, etc.

The project's major steps areto:

Step 1: Face Detection

Step 2: The creation of the face database

Step 3: Data Gathering

Step 4: Model Trained

Step 5: Mark Automatic Attendance

Face Detection:

Student attendance system based on face recognition, in which Face detection can detect any face in the picture, if one is present. At the other side, facial recognition tells us whom face it is if the face is stored in the dataset earlier. During this project, the user's picture of attendance is captured Camera and if this individual had his face captured and trained before, the recognizer would make a guess, returning user Id and index showing how happy the identifier is with this match.
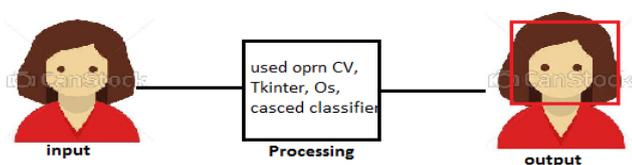

FIGURE 5: FACE DETECTION

The creation of the face database:

Until the attendance management system based on face recognition will operate, there is a collection of data that must be inserted into the program, consisting simply of the basic details of the person, which is its identity and faces.They are stored in a file in a hierarchy way after the face recognition. In this project all faces will be located there under 'Training Images' folder in a systematic order. Broadening through the
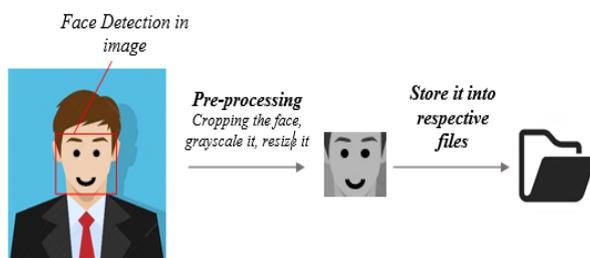
Server directory. The whole process of face recognition mechanism is done by the script named AMS_RUN.py. This is used *LBPHFfaceRecognizer()"*algorithm for face recognitions.Throughout the process, the system will first indicate the position of a face in the captured image, and if no face is detected, the system will ask the user to capture their face again until it reaches a certain number of images that will be 70 to 80images necessary for each student in this project.

FIGURE 6: FACE DATABASE CREATION

Data Gathering:

Data collection is a process by which several photos of user's faces are collected and stored with a specific Id for this kind of person. This series of facial images of each user is referred to as Dataset. It is required for training the face recognition.

Model Trained:

After creating the database of face then need to trained the model after this system will be able to mark automatic attendance based on already stored images of students. The first process used *"LBPHFfaceRecognizer()"* method that will be able to store images used in attendance system of students. After this the most important method "get Images and lables()", that method will able the system ton used stored images with the name and ID of student, Due to this system will be able to mark attendance with name and ID of students.
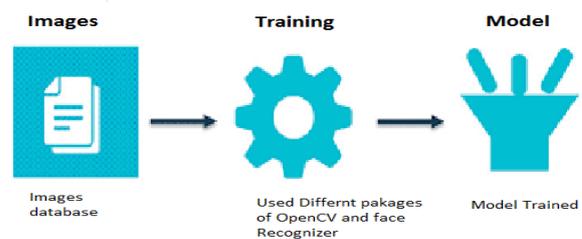

FIGURE 7: MODEL TRAIN

Data model is trained. Aftertrainingthedatasetdataisstoreindatabase.Studentdata store with name, id and subject. If student recognize face match with already store database then mark the attendance if face not match with already store data then it shows empty. First of all student will choose subject after this *"cv2.face.LBHFaceRecognizer ()"* will perform their work and recognize the student image after this will classify the

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image with stored images. If will match date and timemethod willputtheattendancewithdateandtimeandnowattendance mark successfully.

V. DATA ANALYSIS & RESULTS

We have been used python modules to develop and design system likeOpenCV, numpy, pillow, tkinter, os,mysql, pandas,ttk, etc.

Specific Requirements:There are many criteria to get the face recognition system. The applications or packages needed to achieve this aim are the given below.

➢ Required software: PyCharm Community, Python 3.8

➢ Required packages: OpenCV with cv2.cascadeClassifier, OpenCV, Numpy, os,Pandas,date and time,Classifier, Recognizer, face Detector

➢ tkinter package - To provide user interface and os package

➢ Camera module – To interact with the raspberry pi's camera

➢ File Folder- used for storing the images data (face database)

Results

Graphical user interface application framework for student's attendance management system based on face recognition.
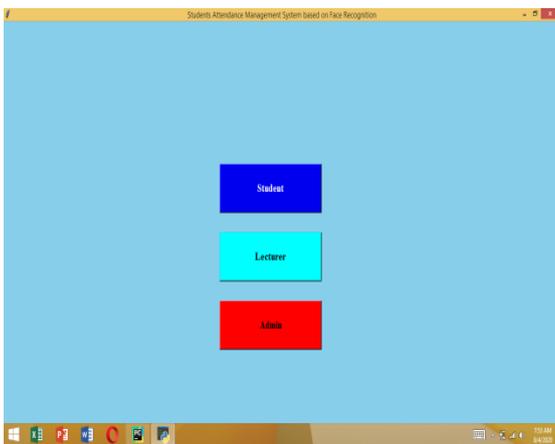
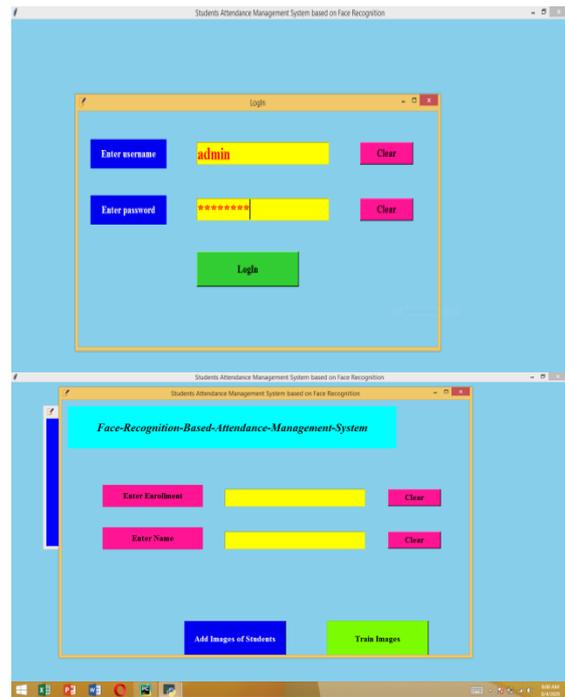**FIGURE 8: MAIN INTERFACE OF SYSTEM**

FIGURE 9: ADMIN LOGIN FORM
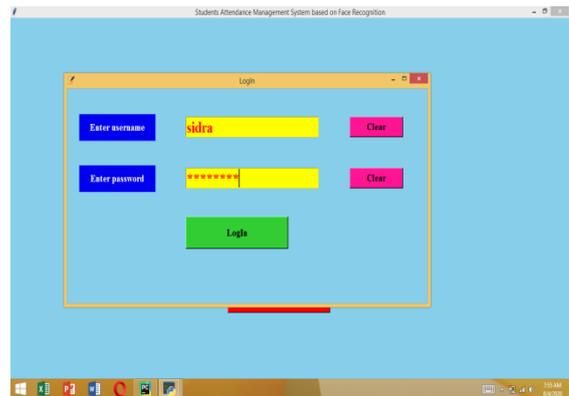
FIGURE 10: ADMIN MAIN INTERFACE

FIGURE 11: ADMIN MAIN INTERFACE

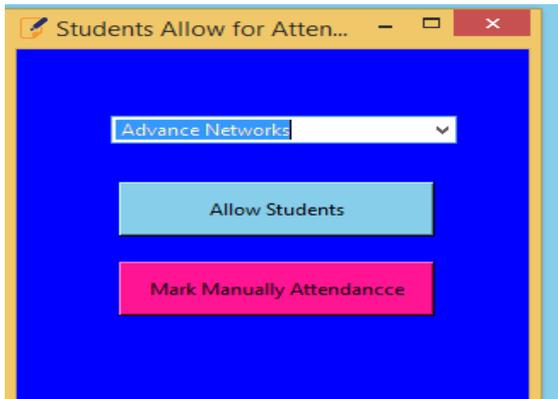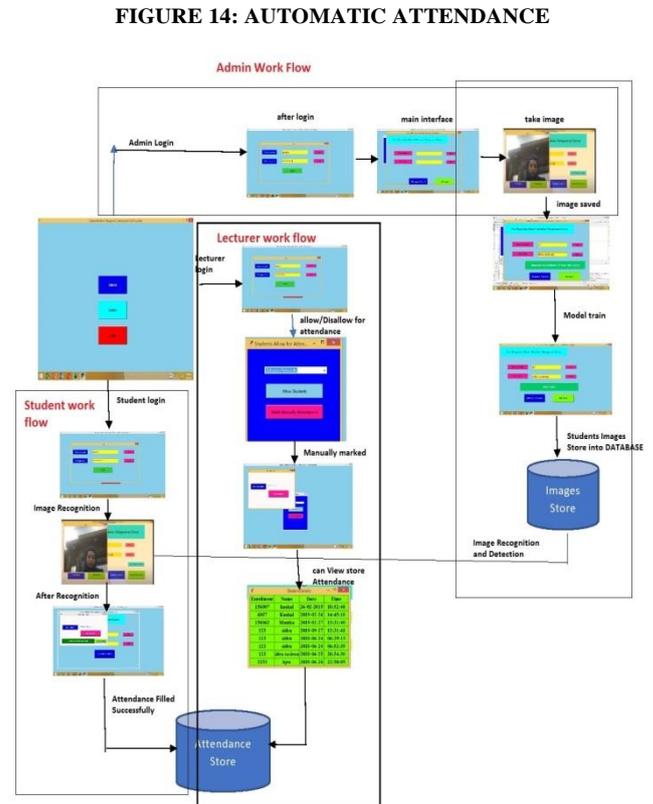**FIGURE 12: LECTURER MAIN INTERFACE**

FIGURE 13: IMAGES STORE INTO DATABASE

FIGURE 14: AUTOMATIC ATTENDANCE

FIGURE 15: FRAMEWORK DIAGRAM OF SYSTEM
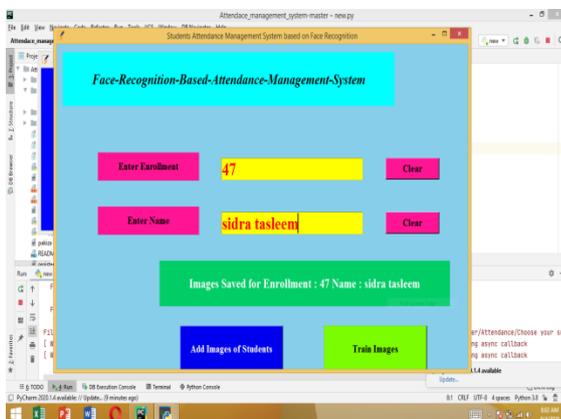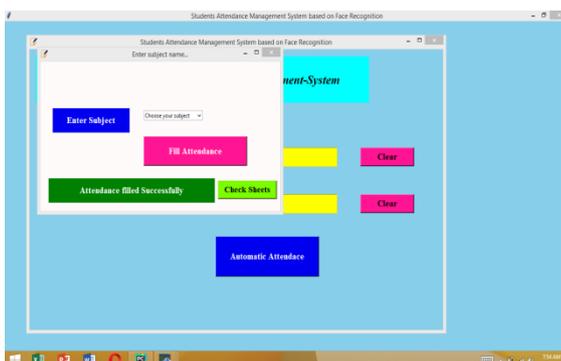
VI.   DISCUSSION & CONTRIBUTION

Our attendance system has been fulfilled all requirements, dependencies and it provide us all results that we decided before development of our attendance system.

Our contribution is to develop a very easy and rapid system for marking the attendance without any wastage of time. In our system student will mark their attendance easily with the help of face recognition. In many systems accuracy is high but cost is also high that will not affordable of all institutions, but in our system no need to high cost student will mark their attendance online. In our system used LBPHfaceRecognizer algorithm that is best for face recognition. Current work is focused on the face recognition based attendance.

VII.   CONCLUSION

Thisarticleprovidesareviewvarious   advance technologiesthatuseful   to   make   automatic   attendance management   system.   Teacher conventionallyassumesstudents'attendanceandwillwastemuch

more teacher time. In the traditional system much moreproxy attendance may be recorded. This can be replaced with computerized system. It can be inferred that an automated attendance system of student using the technique of identifying the human face works very well.Among all the latest technology facial recognition technology is veryuseful

inallfields.Itisusedtomanageandupdatetheattendanceis very attractive and useful way as compare to traditional mark attendancesystem.

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