ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

AUTOMATIC CLASSROOM ATTENDANCE SYSTEM

SK.CHINNA BAJI [1], K.BHAVANI KIRANMAYE[2], P.DIVYA[3], P.DARSINI[4], P.DILEEP[5].

[1]*Assistant Professorin Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology.*

[1]shaik.chinna56@gmail.com

[2,3,4,5.] *B. Tech in Dept Of Electronics And Communication Engineering In Potti Sriramulu Chalavadi Mallikarjunarao College Of Engineering & Technology.*

[2]lovelykiranmai475@gmail.com

[3]divyapondugula3@gmail.com

[4]darshinipalukuri@gmail.com

[5]pamididileep2000@gmail.com

ABSTRACT:*The Traditional attendance system includes Data manipulation, possible human errors, Time taking process and it is Ineffective and Outdated. To avoid these problems they are using biometric and RFID technology there are some drawbacks in that. So we introduced an Automatic Classroom Attendance System, it is easy to manage the attendance of the students in schools and colleges. This System is based on face detection and recognition, it detects and recognizes the students face and generates attendance to that particular student and whenever the student goes out from the class they noted as absent and it takes clicks on every period .When compared to traditional attendance system this system Records all the data automatically and Provides accurate results. In this proposed system the attendance can be monitored automatically. This system will reduce a lot of manual work of education institutions.*

INTRODUCTION

As we have seen in many schools and colleges that faculty members are facing the problem of proxy attendance, maintaining all hand written document of student attendance of each batch/class every day. It is very difficult task for them.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

To reduce their work many techniques are come into picture.

- RFID system: In this system student has to carry RFID card for attendance purpose every day. That card consists of chip by swiping this into card reader the system will read all details of student and marks the attendance.
- Biometric system: It will scan the unique part of body such as fingerprints. At initial we have to store fingerprints of each candidate in database. During attendance present fingerprint and stored fingerprint get checked.
- Bluetooth system: It is used for removing proxy attendance over limited population. But it allows only eight connections at a time. This above systems totally based on hardware device. In case of software system many face recognition techniques are used for attendance. Eigenfaces, LBPH, fisherfaces, SIFT these are some face recognition techniques. For face detection AdaBoost, SVM based, Viola-Jones face detector these algorithms are used. In our implementation we are using Haar cascade algorithm and AdaBoost classifier for face detection and recognition. It is divided into four steps. Haar feature: It collects the features and expression of faces. It takes all features by analyzing all images which it captures. Internal Image: After collecting all features it creates internal image using line feature, edge feature, four rectangle feature, etc. these are some pixel calculations.

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies. It forms core research area within engineering and computer science disciplines too.

Image processing basically includes the following three steps:

- Importing the image via image acquisition tools;
- Analyzing and manipulating the image;
- Output in which result can be altered image or report that is based on image analysis. There are two types of methods used for image processing namely, analogue and digital image processing. Analogue image processing can be used for the hard copies like printouts and photographs.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

Image analysts use various fundamentals of interpretation while using these visual techniques. Digital image processing techniques help in manipulation of the digital images by using computers. The three general phases that all types of data have to undergo while using digital technique are pre-processing, enhancement, and display, information extraction. In this lecture we will talk about a few fundamental definitions such as image, digital image, and digital image processing. Different sources of digital images will be discussed and examples for each source will be provided. The continuum from image processing to computer vision will be covered in this lecture. Finally we will talk about image acquisition and different types of image sensors. Digital image processing is the use of a digital computer to process digital images through an algorithm. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems. The generation and development of digital image processing are mainly affected by three factors: first, the development of computers; second, the development of mathematics (especially the creation and improvement of discrete mathematics theory); third, the demand for a wide range of applications in environment, agriculture, military, industry and medical science has increased.

LITERATURE SURVEY

Earlier, the pen-paper-based method was used for marking and storing attendance. The improvement in biometric detection and recognition methods has resulted in the possibility to build a complete automated attendance management system.Face recognition based methods for attendance management has many advantages over the traditional attendance methods. The main challenge with the face recognition based method for attendance is to ensure that it recognizes every detected face.

BLOCK DIAGRAM

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

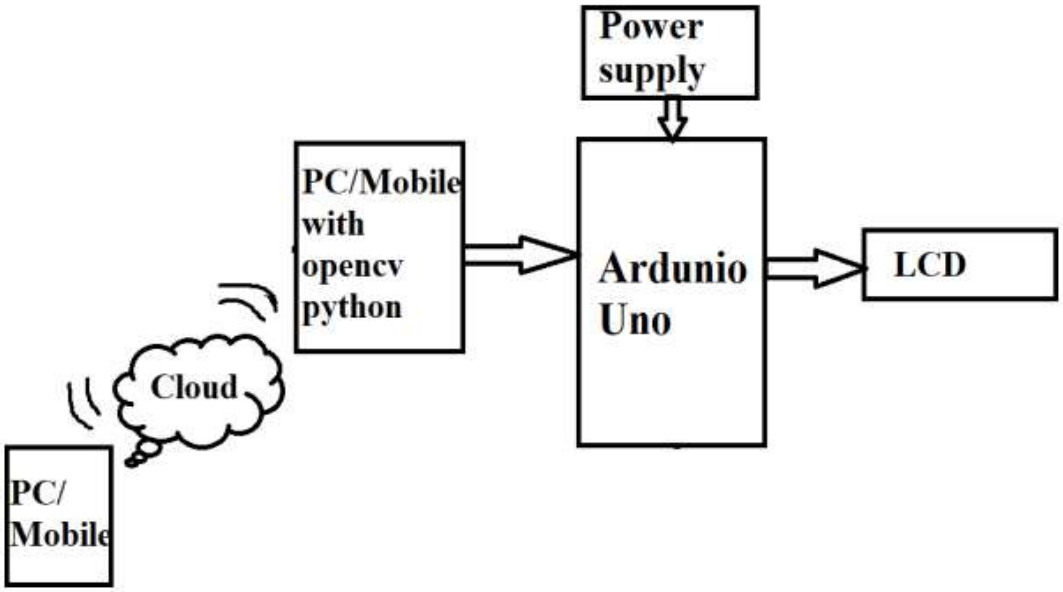

Fig.1: Block Diagram of Automatic Classroom Attendance System

Maintaining the attendance is highly important in all the organizations for checking the performance of employees/students. Each organization has its own way in such manner, some are promoting participation physically by using the old paper or record-based processes and some have received strategies for programmed participation using some biometric systems. But sometimes people used to stay for long time in queues to enter in to the organizations. Each biometric framework undergoes some enrolment process in which highlights of an individual is kept in database after the procedures of recognizable proof check and verification. These processes compare the biometric features of a person with previously stored template captured at the time of enrolment. Face recognition comprises of two steps, initially faces are detected and then these detected faces are compared with the database for verification. Face recognition is mostly used in various areas like security, access control, forensic medicine, police controls, and in attendance management system. Pattern recognition and matching consists of classification, processing the input and matching it with a known pattern. Face recognition is high complex form of pattern recognition. It consists of highly ambiguous input signals, with multiple dimensions and matching them with the know „signals „. This requires many training samples. Several ways have been proposed to solve this problem. Face recognition based on face prints

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

can quickly and accurately detect target individuals when the conditions are favourable. If the subjects face is partially detected or not facing forward, or if the light is not enough, the system is less reliable. However, the technology is developing quickly and there are several emerging approaches. There are many methods implemented for face detection, one of the method is by using skin segmentation process.In this method, detecting face in a complex background is possible; when the image is given it will detect the skin cells by using threshold and image processing techniques, the time complexities will increase with the increase in size as it hasto detect every pixel in the image. And face recognition can be done by using histogram matching technique under certain limitations, as the intensity of the natural light will have a huge impact on this technique and as the light intensity changes, the pixel values also changes, which results in error in the system . To reduce these errors, an alternate method is used called as pattern matching in LabVIEW, which uses machine learning algorithm to match the template in given image and it is is more reliable than any other methods Image Acquisition LabVIEW, vision development module contains NIIMAQdx. Vision Express modules which are used to set up image acquisition systems and acquire images. These modules contain Virtual Instruments (VIs) which allow us to acquire images, open and close interface. In this project, Vision Express VIs are used to develop common image acquisition and processing the application. It contains step by step procedure to interface device. Once USB camera is connected, shown in select Acquisition source tab, select the device and click on next to navigate the Acquisition type. Here we are selecting continuous Acquisition mode, which will acquire images from camera continuously and most recent image is acquired and sent for further processing. By clicking on next it navigates to configure Acquisition settings where video mode is chosen as 640x480 YUV, so that the time for operating on the images is reduced as it requires small size. Then by clicking finish the device is configured and ready to grab these images from the camera. The image which is captured by the vision Acquisition is passed to next VI called as vision Assistant, which creates, edits, and runs vision algorithms using NI vision Assistant. When we place this VI on block diagram, NI vision Assistant Launches. It contains image processing functions like edge detection, morphology, filters, which are used to create an algorithm using these functions. This algorithm is used to select the required controls and indicators which is required to programmatically set in LabVIEW. In this Project the VI reduces the noise and fix the brightness in the input image and then convert it from RGB to grayscale. This image is passed to next step face Detection. For face detection Vision Assistant VI is used. As this VI contains pattern matching, this uses the machine learning and template matching algorithm to detect the face in the input image. For this purpose, template is created by taking a real

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

human face and train the VI and to learn the curves that results from eyes, nose and mouth in the given image as shown. Whenever it receives the image from the preprocessing step (B) it uses the template matching algorithm to detect the face and draw a bounding box around the detected face as shown . The marked green lines are the curves that are trained to detect the face from given image as shown. The detected faces are stored in the folder/DB for recognition process. For this purpose we have to make sure that the detected face contains face or not as template matching gives some error file finding so, created a vi which will look for the eyes the in the image and calculate the distance between them if the eyes has a distance of 60 to 193 pixel it will conform that the image passed contains a face and then it is stored in the folder/DBFor face detection Vision Assistant VI is used.

PYTHON SOFTWARE

The programming language Python was conceived in the late 1980sand its implementation was started in December 1989 by Guido van Rossum at CWI in the Netherlands as a successor to ABC capable of exception handling and interfacing with the Amoeba operating system. Van Rossum is Python's principal author, and his continuing central role in deciding the direction of Python is reflected in the title given to him by the Python community, Benevolent Dictator for Life (BDFL) (However, van Rossum stepped down as leader on July 12, 2018. Python was named after the BBC TV show Monty Python's Flying Circus. Python 2.0 was released on October 16, 2000, with many major new features, including a cycle detecting garbage collector (in addition to reference counting) for memory management and support for Unicode. However, the most important change was to the development process itself, with a shift to a more transparent and community-backed process. Python 3.0, a major, backwards-incompatible release, was released on December 3, 2008 after a long period of testing. Many of its major features have also been back ported to the backwards-compatible, though now-unsupported, Python 2.6 and 2.7.

Python reached version 1.0 in January 1994. The major new features included in this release were the functional programming tools lambda, map, and reduce. Van Rossum stated that "Python acquired lambda, reduce (), filter () and map (), courtesy of a Lisp hacker who missed them and submitted working patches".[13] with The last version released while Van Rossum was at CWI was Python 1.2. In 1995, Van Rossum continued his work on Python at the Corporation for National Research Initiatives (CNRI) in Reston, Virginia from where he released several versions. By version 1.4, Python had acquired several new features. Notable among these are the Modula-3 inspired keyword

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

arguments (which are also similar to Common Lisp's keyword arguments) and built-in support for complex numbers. Also included is a basic form of data hiding by name mangling, though this is easily bypassed. During Van Rossum's stay at CNRI, he launched the Computer Programming for Everybody (CP4E) initiative, intending to make programming more accessible to more people, with a basic "literacy" in programming languages, similar to the basic English literacy and mathematics skills required by most employers. Python served a central role in this: because of its focus on clean syntax, it was already suitable, and CP4E's goals bore similarities to its predecessor, ABC. The project was funded by DARPA. As of 2007, the CP4E project is inactive, and while Python attempts to be easily learnable and not too arcane in its syntax.

OPEN CV

OpenCV (Open Source Computer Vision Library) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel. The library's cross-platform and free for use under the open-source Apache 2 License. Starting with 2011, OpenCV features GPU acceleration for real-time operations. Most computer scientists and practical programmers are aware of some facet of the role that computer vision plays. But few people are aware of all the ways in which computer vision is used. For example, most people are somewhat aware of its use in surveillance, and many also know that it is increasingly being used for images and video on the Web. A few have seen some use of computer vision in game interfaces. Yet few people realize that most aerial and street-map images (such as in Google's Street View) make heavy use of camera calibration and image stitching techniques. Some are aware of niche applications in safety monitoring, unmanned flying vehicles, or biomedical analysis. But few are aware how pervasive machine vision has become in manufacturing: virtually everything that is mass-produced has been automatically inspected at some point using computer vision. OpenCV has a modular structure, which means that the package includes several shared or static libraries.

The following modules are available:

- Core functionality (core)-A compact module defining basic data structures, including the dense multi-dimensional array Mat and basic functions used by all other modules.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

• Image Processing (imgproc)-An image processing module that includes linear and non-linear image filtering, geometrical image transformations (resize, affine and perspective warping, generic table-based remapping), color space conversion, histograms, and so on.

• Video Analysis (video) -A video analysis module that includes motion estimation, background subtraction, and object tracking algorithms.

• Camera Calibration and 3D Reconstruction (calib3d) - Basic multiple-view geometry algorithms, single and stereo camera calibration, and object pose estimation, stereo correspondence algorithms, and elements of 3D reconstruction.

RESULTS

STEP 1 • initially open the code in visual studio and we have to click on the run button to display the below window.

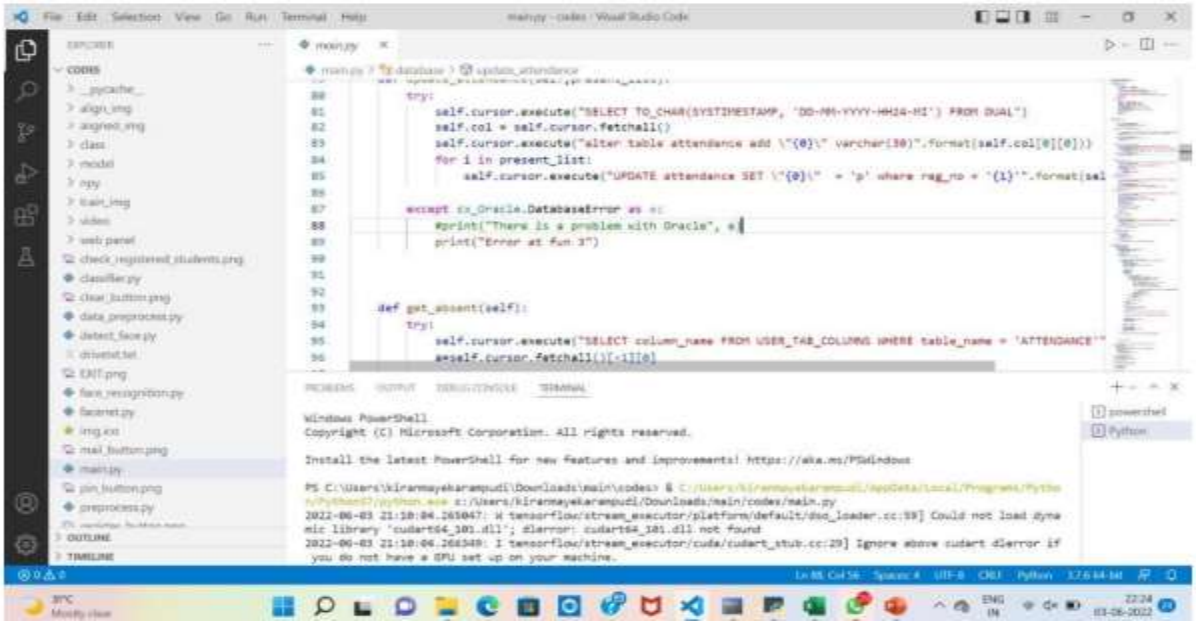

Fig.2: Python code window

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

Fig.3: Student registration window

- Now we have to click on the take attendance to display the below window. In the below picture it is recognizing and detection the face.

Fig.4: Taking Attendance Window

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

Fig.5: Face Detecting known's and Unknown's face windows

- When you click on the 'q' button then the camera video will be close and then when you click on the "Get reports" it will gives the attendance of a student on the Excel sheet.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

Fig.6: Click on Get Reports

At here it will take number of pictures of people.

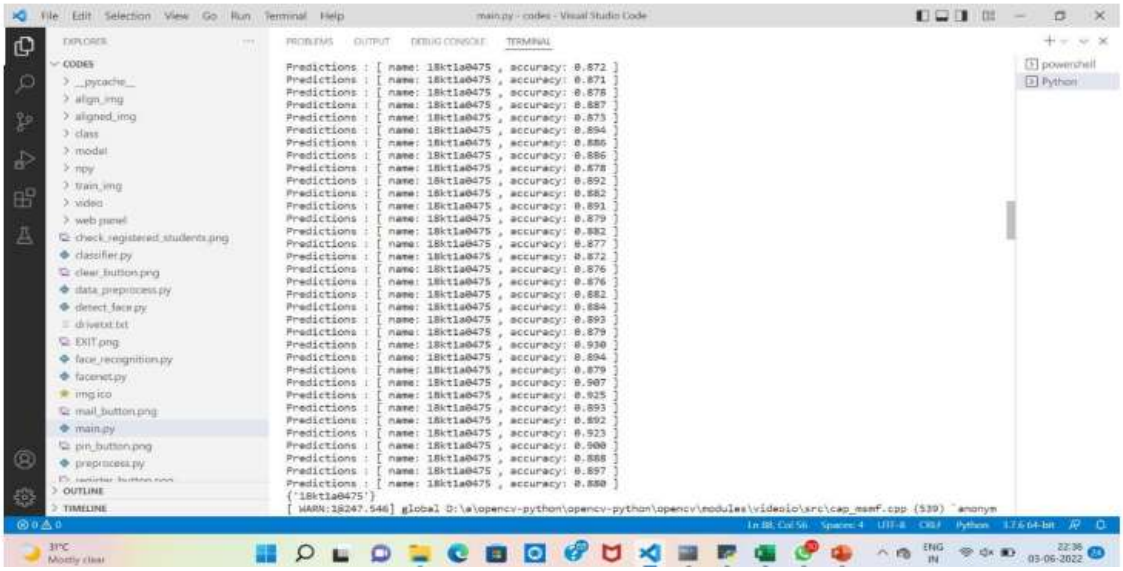

Fig.7:Samples of students

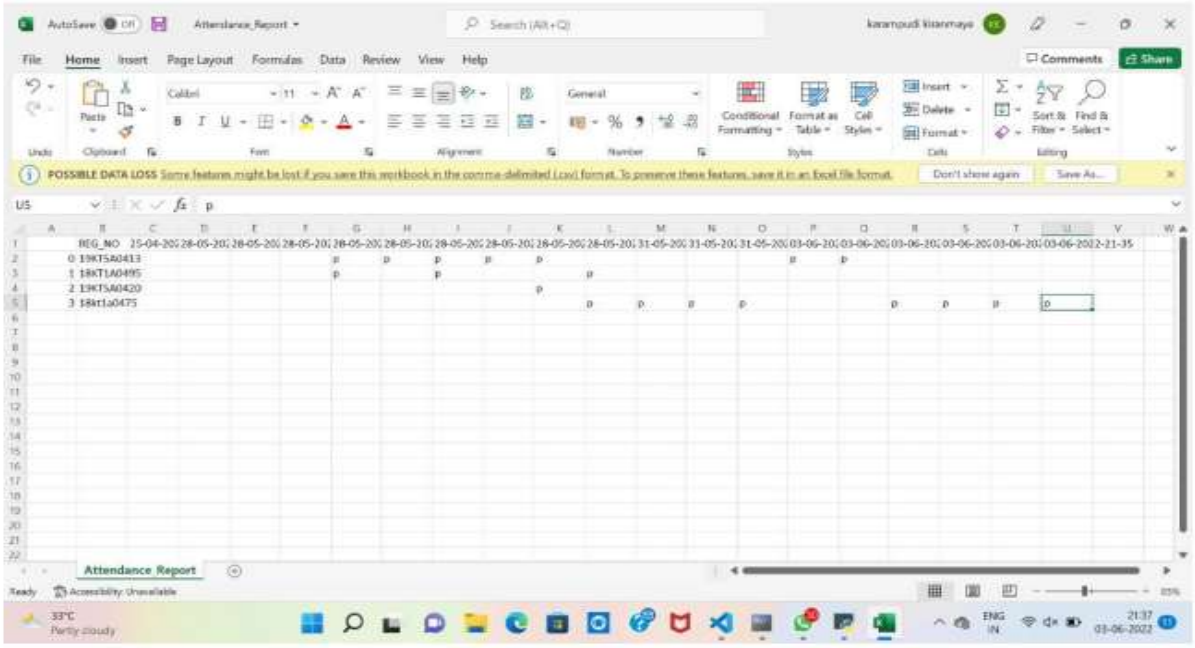

Fig.8: Excel Sheet

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

- Coming to hardware part,initially it's shows like the below picture.

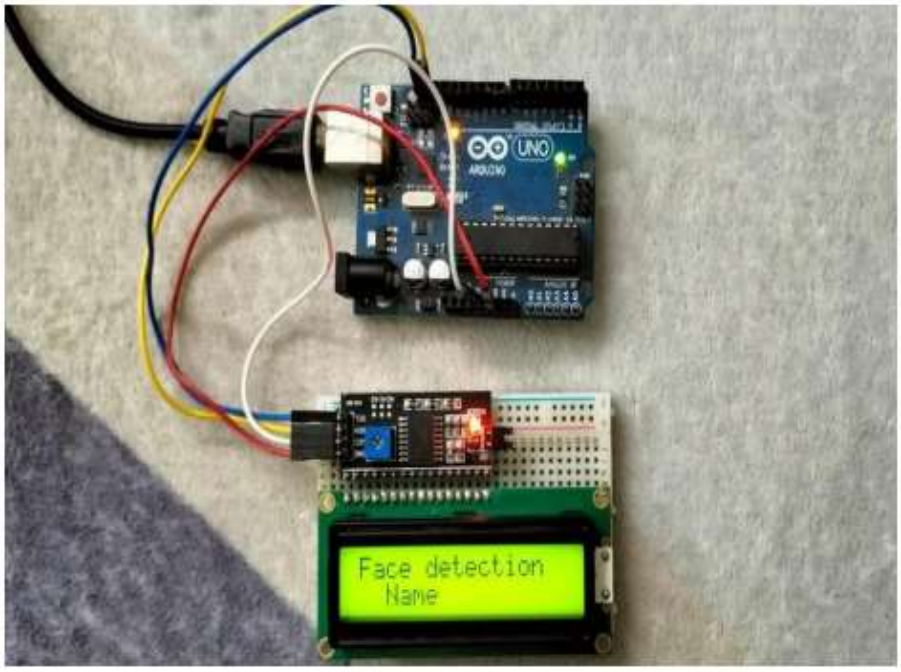

Fig.9: Hardware Components

- When run the software code then it automatically displays the presenters on excel sheet as well as LCD display.

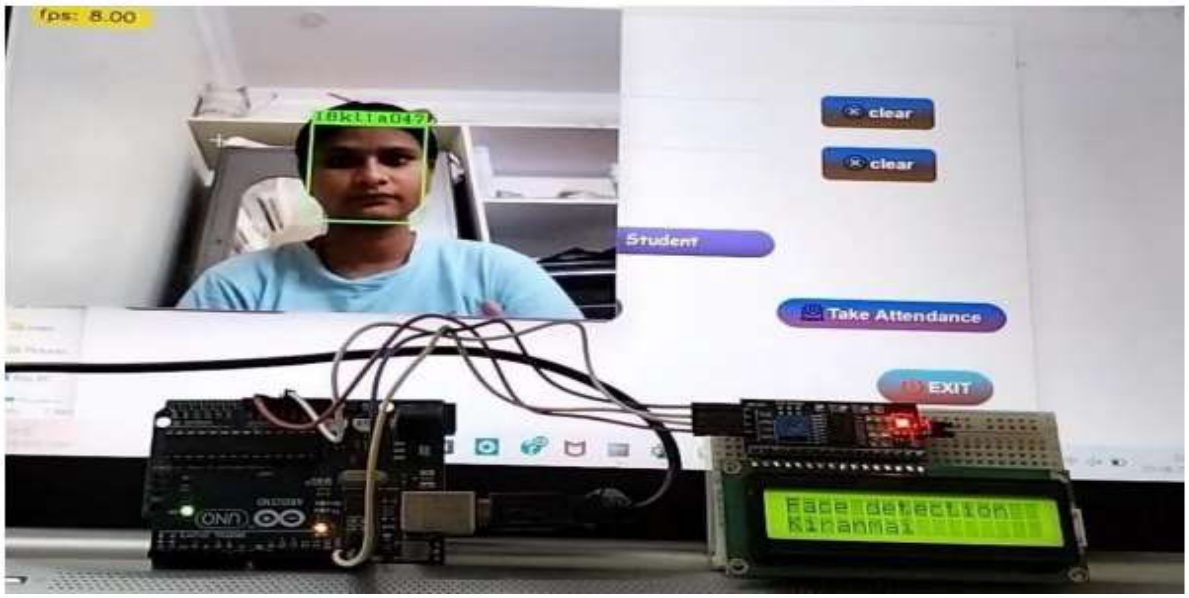

Fig.10: Name Displayed on LCD

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

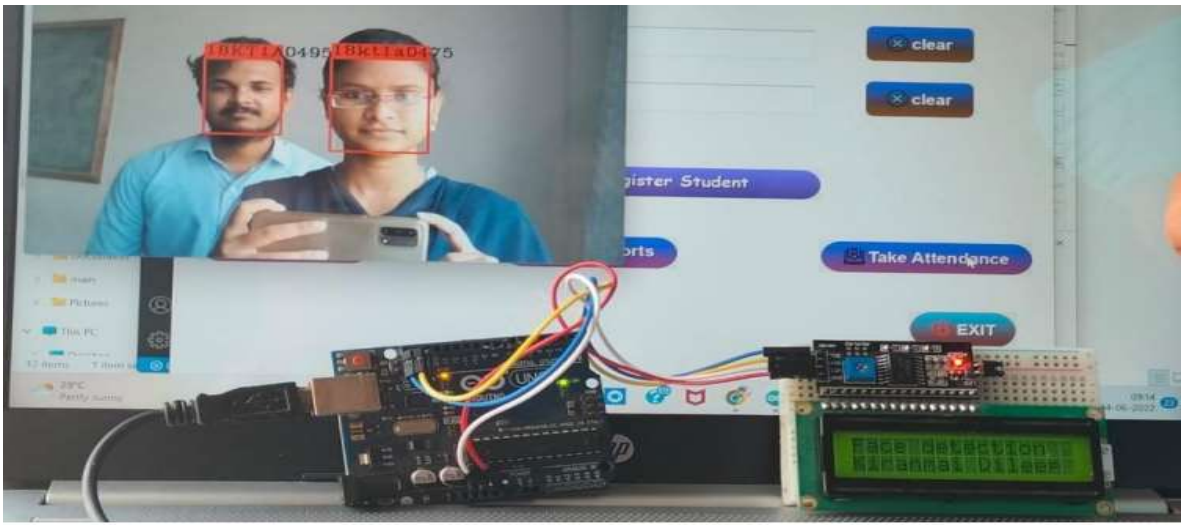

Fig.11: Red Indicates Absentees For Before Class

If the student was absent in before period and the student present in current class,while the student face is detecting it will shows red colour rectangular box on the face of the student which means that particular student is absent for before class.

CONCLUSION

Basically this system work for improving attendance system in every domain like schools, colleges, organizations, institutions and companies. Capturing live images from camera and applying different techniques of face detection and face recognition which will reduce manual or traditional work. In our solution, by creating interface we generate the dataset. We trained the images using Haar Cascade. After completing training it will successfully detect and recognize faces and non faces. When stored images and compared images matched then attendance sheet get updated automatically with time and date. As it stored the entering time of every student it becomes easy for faculty member to keep track on time of student.

FUTURE SCOPE:An automatic classroom attendance system is a necessary tool for any learning management schools. Most of the existing systems are time consuming and require a semi manual work from the teacher or students. Our approach aims to solve the issues by integrating face recognition in the process. Even though this system has disadvantages like detecting large number of faces, there is much more room for improvement. Since we implement a modular approach we can improve different

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

modules until we reach an acceptable detection and identification rate. The system can be enhanced in such a way that the accuracy, detection rate and recognition rate can be increased so that more number of students can be detected and recognized for those who are present in the class.

REFERENCES

1. Pandya, J. M., Rathod, D., &Jadav, J. J. (2013). A survey of face recognition approach. International Journal of Engineering Research and Applications (IJERA), 3(1), 632- 635.

2. Bhatia, R. (2013). Biometrics and face recognition techniques. International Journal of Advanced Research in Computer Science and Software Engineering, 3(5).

3. Chiagozie, O. G., &Nwaji, O. G. (2012). Radio frequency identification (RFID) based attendance system with automatic door unit. Academic Research International, 2(2), 168.

4. Rajath S Bharadwaj, Teju S Rao, Vinay T R, "Attendance Management Using Facial Recognition", IJITEE, Vol: 8, Issue: 6, April 2019.

5. Narendar Singh, M Kusuma Sri, K. Mounika, "IoT Based Automated Attendance with Face Recognition System", Vol: 8, Issue:6S4, April 2019 .

6. .VenkataKalyan, Muralidhar Reddy, Dheeraj Ravi, MahithaSai, "Attendance system based on face recognition", IRJET, Vol: 5, Issue: 4, April-2018.

7. Ali Akbar, ChowdharyObaid, ChoudharyYasir, "Automated Attendance Management System Using Face Recognition" IJARCET, Vol: 6, Issue: 8, August 2017 .

8. Reetha. S, Dr. P. Visu, "Student Attendance Marking Using Face Recognition in Internet of Things", IJCST, Vol: 5, Issue: 3, May-June 2017.

9. .RohitChavan, BaburaoPhad, SankalpSawant, VinayakFutak, Asha Rawat, "Attendance Management Using Face Recognition" , IJIRST, Vol: 1, Issue: 11, April 2015.

Author Profiles:

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

[1]**SK CHINNA BAJI (M-Tech)**, Assistant Professor in Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology, having teaching experience of 7 years in various engineering colleges.

[2]**K.BHAVANI KIRANMAYE**,Studying B-Tech in Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology.

[3]**P.DIVYA**,Studying B-Tech in Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology.

[4]**P.DARSINI**,Studying B-Tech in Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology.

[5]**P.DILEEP**,Studying B-Tech in Department of Electronics and Communication Engineering in Potti Sriramulu Chalavadi Mallikarjunarao College of Engineering & Technology.