

Automated Attendance System Using RFID and Face Recognition

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Abstract - Maintaining attendance system in colleges has been a problematic task as work was ongoing manually. Launch a system to monitor and analyze student count in college transportation. The existing system is focuses on manual attendance system (Using paper and pen). The drawback in existing system is less efficient and time consuming. There is a need to develop a system that reduces burden in analyzing the attendance and enhance smooth functioning of college bus and to help for parents. We proposed an automated attendance system using RFID (Radio Frequency Identification and Detection) and Face Recognition. In most cases, maintain attendance through smart card collects data of students and updates automatically. As an add up feature HAAR CASCADE ALGORITHM for face recognition is helpful to security and surveillance.

Index Terms - *RFID Reader Scanner, RFID Tag, Facial Recognition, Open CV*

I. INTRODUCTION

It is a well-known fact that for an organization to operate effectively, whether it be commercial or educational, it must maintain a proper record of its employees' or students' attendance. In every institution, the bus in-charge prefers to collect attendance with paper and a pen and manually input it into the system. The bus in-charge may also pass out a sheet of paper and ask the students to sign it as this is traditional method and boring. Both have their own disadvantages, but we built two modules into our project that use RFID and face recognition to automate everything to reduce the burden and for smooth functioning of an organization. The main purpose of developing attendance management system is to computerized the tradition way of taking attendance and for developing the software is to generate the report automatically at the end of the day.

The hardware side and the software side are the two main components of the development of the attendance system. The system, which keeps a login of the ID, time, and data of each student, allows personnel with the appropriate authority to log

in and check for information there. It can also add new students to the list by using their facial image and their smart card's tag ID. The major goal of this effort is to make the system for tracking attendance effective, time-saving, straightforward, and uncomplicated. Face recognition techniques will be used in this instance to identify faces. The processed image will then be compared to the already-stored record, and attendance will then be recorded in the database as appropriate. This technique decreases the amount of labour that people must do when compared to the current system's traditional attendance marking system.

II. LITERATURE SURVEY

There are numerous proposals for Automated Attendance System in the market. Nowadays, RFID and Barcodes are most frequently used in an organization and it is installed where ever information needs to be read automatically.

Sifatnur Rahman, Mahhabur Rahman and Md.Mijaur Rahman (2018) proposed an “**Automated Student Attendance System using Fingerprint Recognition**”.[1]This system uses Minutia Feature Extraction Algorithm to recognize and analyse the fingerprint. The proposed system has the following five major components User and Device Interface, Data Acquisition with fingerprints, Fingerprint Processing, Fingerprint Verification and Attendance Report Generation.

V.Ghodekar, A.kute, S.patil and prof.R.Thakur (2013) proposed an “**Automated Attendance system with RFID through SMART CARD**”.[2]The Existing system of this paper was the Manual Attendance system. It proposed a system which detect the presence of the students by using RFID through Smart Card. It didn't identity individual based on who he/she is which therefore, can lead to impersonation.

C.Gomes, S.Chalchal, T.Desai, D.Jadhav (2020) proposed “**Class Attendance Management System using Facial**

Recognition”.[3]The proposed system of this is implemented with 4 phases such as Image Capturing, Segmentation and Face Detection, face Recognition and finally Updating the Attendance in the database.

III. EXISTING SYSTEM

In every Institution the bus in- charge prefer to use paper and pen to take attendance and manually enters into the system or by passing a sheet of paper, asking the students to sign in the attendance sheet. Both has its own drawbacks, In the first case, it is difficult to call all the student in the bus and it might take time; In the Second case friends of absent students may write down their names in the attendance sheet.

IV. PROPOSED SYSTEM

We developed automated student attendance system in transportation through RFID and Face Recognition. The RFID Transponder will be installed in every bus and every student will be provided with a smart card with unique ID, if the student swipes the card, the attendance will be automatically stored into a database through MY SQL.As every tag has its unique ID it is easy to differentiate every tag holder. If the student is not verified within time or absent means the warning message will be send to the respective teachers and parents.

As face is the representation of one’s identity we have introduced an module Face Recognition and it is done by Haar Cascade Algorithm and we have used cascade classifier for better detection of face. This system provides the functionalities such as taking images of the student along with their details for the database, training the images and finally tracking the image of the student who are entering into the college bus. As our code prepared with python in Open CV generates 2D grayscale images of the students that work as the input and after being trained on those images, the system finally detects faces on live camera feed. It is also done in 4 Phases such as Image Capturing, Segmenting the image and Face Detection, Face Recognition and Updating the data into the database.

IV. SYSTEM REQUIREMENTS

- Hardware Requirements
- Software Requirements

A. Hardware Requirements:

RFID:

RFID Reader contain of smart card, the RFID system comprises of three components that is an antenna, a transceiver and a transponder the antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the RFID tag with unique ID transmits data back to the antenna. Using the RF the RFID tag can be read by the RFID reader.

SMART CARD:

It is build by with wide variety of chip, it is used in wide range of application. It is a device that includes an embedded integrated circuit that can be either secure microcontroller or equivalent intelligence with internal memory or a memory chip. The Function of the Smart card is based on microcontroller.

CAMERA:

It is used to collect the data from the user for processing and also to recognize the particular image.

NODEMCU (microcontroller)

It is a microcontroller of our device, it helps in connecting the laptop with other device with the help of IOT (Internet of Things) and also used to transfer the data from one device from another device.

B. Software Requirements:

PYTHON:

It is widely used in every fields as it is user friendly. It has a large and active community that contribute different modules, libraries that helps in solving the problem and supports multiple paradigms, including structured, object-oriented and functional programming.

MYSQL Database

MYSQL is widely used database in web application and it is an Open source. It is a database management system that helps to add, access and process the data that is stored in a computer. It focuses on robustness, stability and maturity

OPEN CV

Open CV is an Open-Source library for Computer Vision, Machine Learning and Image Processing. It supports the programming languages like Python, C++, Java etc. It has a library function which has more than 2500 improved algorithm that helps to detect and recognize face and object. It can process images and videos to identify objects, faces, or even the handwriting of a human when it is integrated with various libraries

V. WORKFLOW

WORK OF ADMIN

If the particular student needs the bus facilities, he/she must be registered to the admin (both RFID and Face Recognition). The admin creates the unique ID for the particular student in smart card and face recognition, and also create the login credentials for the teachers to access the record. The Admin is responsible for creating, alerting, updating and deleting the student data (student name, ID, Contact number, Address).

FUNCTIONS OF RFID

After all the process is completed, if the student swipes the card the RFID reader gets initiated they starts emitting the frequency with respective range of their own and they detect

the RFID tag. The RFID readers reads the tag information and fetch the information of student, as we know that every RFID tag has its unique identity which acts as primary key which refers to the database details of respective student and it marks the attendance.

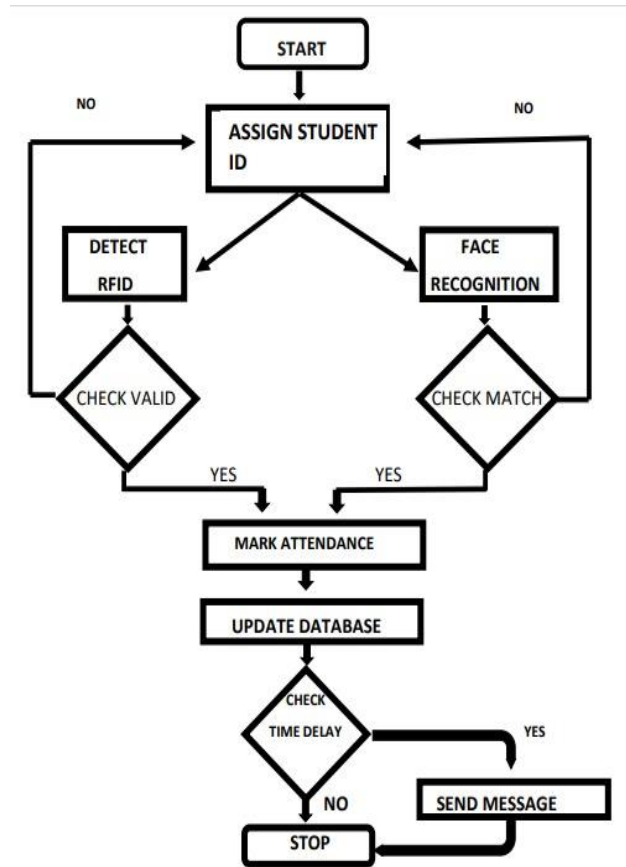


Fig 1. Workflow Of Attendance System

FUNCTIONS OF FACE RECOGNITION

In-case if the student didn't bring the smart card we have an alternate option is Face Recognition, The original database containing the images of the students was created by taking a live real-time video of the students, dividing the video into thirty frames, converting them to grayscale, and storing only the faces of the students as images. We will then be training the corresponding images using the HAAR CASCADE algorithm while storing their respective heights. Open-CV is the programme used to divide the video into frames. If the image matches to the original image it mark the attendance into the database and sends the record of the student to the particular teacher who is in-charge else it sends an message to the parents. As an added on feature we have added an module which says the fees structure of the student. We have included a module that details the student's fee structure as an added benefit.

ACCESS TO TEACHER

The teacher can access the application and view the database of the student. The Particular teacher can also open the Excel sheet ad check the presence of the student and the fees details.

VI. CONCLUSION

The design and implementation of the attendance System based on the RFID and Face Recognition was our main objective of the paper at the end with a success as both part works as expected. It can manage and control the success of an organization by keeping track of student in the bus. This system has the potential to overcome the manual attendance system because it's efficient, secured and convenient.

VII. FUTURE WORK

To improve the functionality and reliability of the attendance system, in future we can add few future to enhance the working

- 1.Extending the UHF RFID reader's read range to 3 meters, it expands the reader's compatibility with all platforms, and GPS can be attached to track the location of the student.
- 2.Add a self-generating defaulter list to every student whose attendance falls below 75%. The system must distinguish between recognised and unknown faces; unknown faces can be recorded in a secondary database.

VIII. RESULT

The RFID module and the camera are interfaced. The Working of the smart attendance system is programmed using Python and it is constructed. The implementation of our Automated Attendance System is done with few students and the proper functioning of our system is verified. Finally the attendance record is collected from the RFID and Face Recognition and stored into the Database.

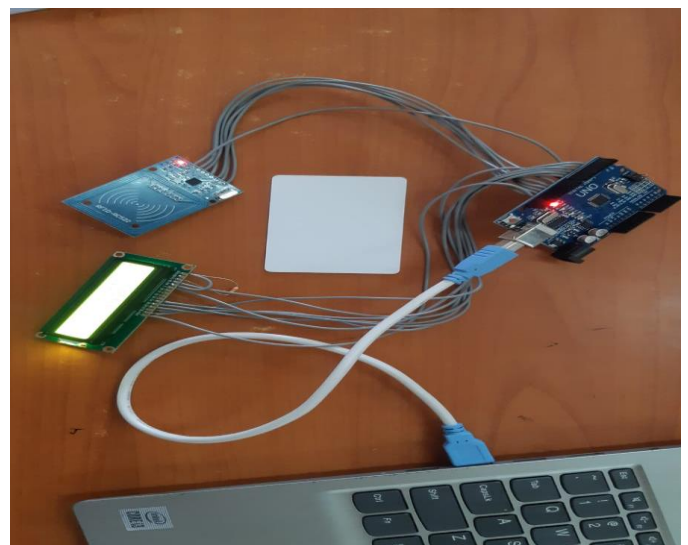


Fig 1. RFID

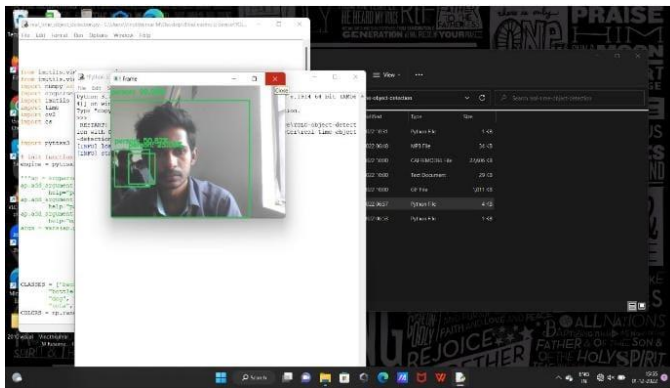


Fig 2. Face Recognition

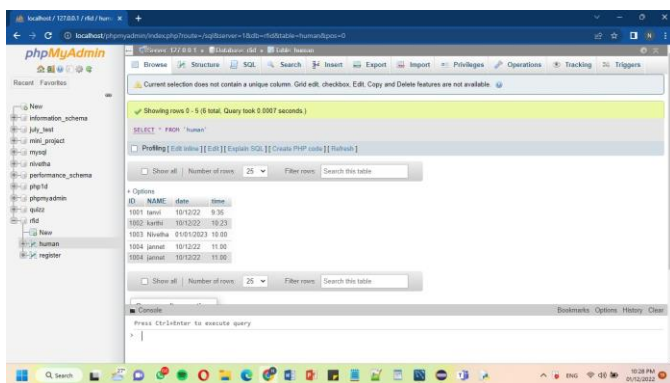


Fig 3. Database

IX. REFERENCE

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