RFID Based Students and Employee Attendance System

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Abstract - **This paper presents an approach for a compact and reliable classroom attendance system by using RFID cards and face recognition techniques. The system initially registers a student's information, including his or her RFID tag number, and then stores the faces in a database before doing face detection. The microcontroller checks for data regularly, and if any is received, it compares it to the data in the database. It minimizes duplicate data entering and lowers the time and entry errors. The authorities will be able to handle the attendance system in a more logical, efficient, and time-saving manner with the help of this system. The traditional technique of collecting attendance, which involves calling names or signing on paper, takes a long time. RFID-based attendance systems with facial recognition are one of the alternatives for eliminating the flaws associated with manual attendance systems.**

Index Terms - **RFID technology, face recognition, radio-frequency identification, attendance monitoring system.**

I.INTRODUCTION

In traditional attendance, systems are easily marked fake attendance, so I am implemented a face recognition and RFID system. In the manual attendance system are take attendance and count how many numbers are present and how many numbers are absent then mark the attendance count. There are many automatic methods available for this purpose i.e. biometric attendance. This system uses the face recognition approach for the automatic attendance of students in the classroom and employees in the working area. This attendance is marked by using a RFID tag and camera. The camera will capture the faces of members and detect the faces in images and compare the detected faces with the database and mark the attendance. RFID, IoT, Industry 4.0, and machine learning techniques offer edge services in several sectors. Introducing these technologies will help tackle the attendance issues. One tires system has many possibilities of having fraud activities and wrong throughputs. An effective and efficient system must contain higher security, low cost, and ease of use. In that respect, working with those technologies will be provided all aspects and eliminate all current issues. RFID system a candidate immediately place the card on the RFID reader. The RFID reader has an antenna in it that accepts the radio frequencies from RFID tags. This RFID-based attendance system has high accuracy and saves time and paper.

The objectives of the proposed design are:
- To overcome the flaws in the previous and existing attendance system which was done manually.
- To reduce the errors and make the system efficient.

II. SYSTEM DESIGN

I use an automatic attendance system with two-step verification in the suggested system. The RFID tag and face recognition are the two steps in this circuit. Data management, tracking pupils, delivering reports, monitoring records, maintaining records, and lastly offering information services are all part of the system's functioning.
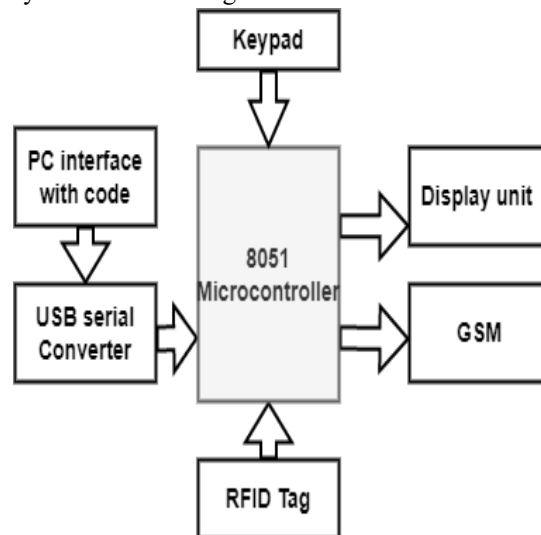

Fig.1 Block diagram for RFID based Attendance system

An RFID system consists of various components that are connected by a dedicated communication path. The individual components are integrated into the system to implement the benefits of the RFID solution. The list of components is as follows:

Tags – an object that is attached to any product and uses a unique sequence of characters to define it. It comprises a chip and an antenna. The RFID memory stores a specific unique number that can be used to identify objects separately. This memory can be either permanent or rewritable, and it can be programmed electrically by the programmer to meet the needs of the system under development.

- Antenna – It is in charge of transmitting information via radio waves between the reader and the tag.
- Reader – a scanning gadget that makes use of its antenna to detect tags in its immediate vicinity It sends out signals at specific frequencies. It reads and sends the number recorded in the RFID tag memory.
- Middleware – it is a communication interface to interpret and process data being fed by the readers into information. It takes into account all relevant ports of communication and a software application to represent this information.
- Backend database – a repository of information, which is designed specifically for the application. The database stores records of data specific to individual tags.

Face Detection is the process where the image, given as an input (picture) is searched to find any face, after finding the face the image processing cleans up the facial image for easier recognition of the face. CNN algorithm can be implemented to detect the faces. After the completion of detecting and processing the face, it is compared to the faces present in the students' database to update the attendance of the students or employees.

A wireless camera transmits a video signal to a wireless receiver through a radio band. Many wireless cameras are powered by a single cable or wire; wireless refers to video transmission; some cameras are battery-powered. Most wireless cameras are technically cordless devices, which means that they must be hooked into a power source even if they broadcast a radio signal. Although some cameras have batteries and are thus genuinely wireless, battery life remains a concern.
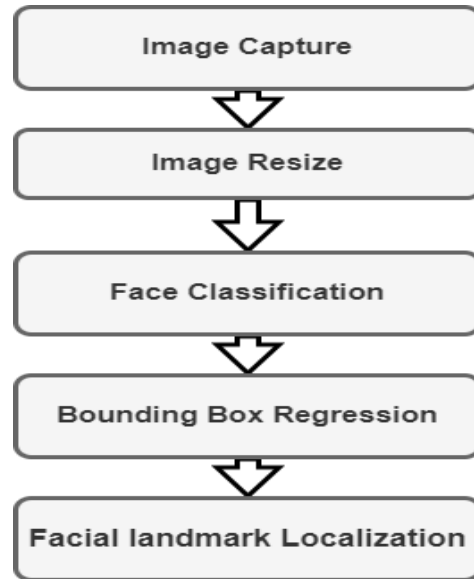

Fig. 2 MTCNN face recognition and detection process

There are two slots on the PIR sensor. Each slot is comprised of a specific infrared-sensitive substance. Because the lens utilized here isn't doing much, I can see that the two slots can see out past a certain distance. Both slots detect the same amount of IR, the ambient amount radiated from the room or outdoors when the sensor is idle.

The attendance is marked using RFID technology. RFID is an automatic ID system. The RFID tag has a coil inside when it is passed near the reader it uses radio waves to communicate with the reader. When a person enters the classroom, the PI sensor detects it. The microcontroller is now turned on. It compares the generated and current codes and displays the results on the LCD display, as well as producing a signal to switch on the relay and GSM module.

III PROPOSED DESIGN

MATLAB and Image Processing Toolbox provide a flexible environment to explore design ideas and create unique solutions for imaging systems. Picture acquisition Toolbox allows you to do a variety of image acquisition tasks, including. Images can be captured with a variety of image acquisition devices, ranging from professional-grade frame grabbers to USB-based Webcams. For image processing, analysis, visualization, and method development, Image Processing Toolbox TM delivers a comprehensive

range of reference-standard algorithms, functions, and apps. Visual Basic is a programming language that allows you to create GUI (Graphics User Interface) programs for Windows. For the user, the programs have a familiar appearance. An event processor controls Visual Basic. Nothing happens until a trigger is triggered. After an event has been identified, the code for that event (event process) is run. After that, program control is returned to the event. The output device of the system is a 16x2 LCD display panel, which is included in the circuit. When the reader reads the stored tag, it shows the user's information.

The serial interface allows connectivity to a local database for data storage and retrieval. The input to the system is the unique tag identifier stored in the RF tag, which is sensed by the reader this proposed system face recognition had done by using Arduino and sensors.
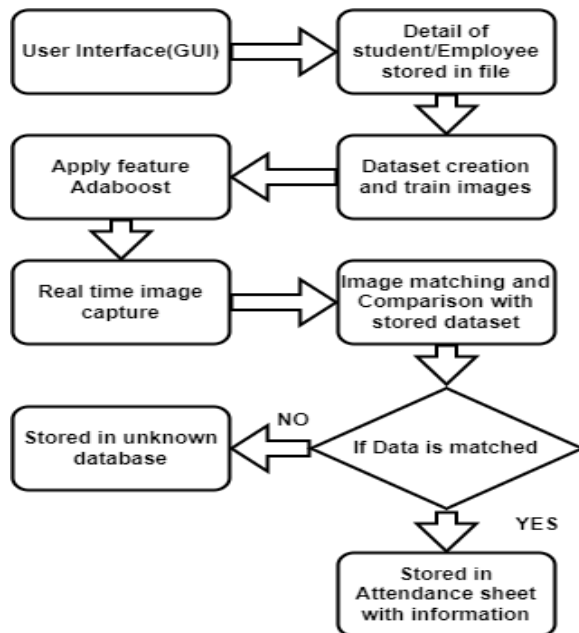

Fig. 3 Flow Chart for Face recognition System

IV. CONCLUSION

Every employee's ID card has been replaced by an RFID card that is used to track their daily attendance as a result of this study. The card's memory contains a sequence of the unique number that it uses to identify the faculty member. It connects the RFID reader to the PC via a USB 2.0 communication connector.

Considering the fact that there are many different ways for tracking students, this system is very easy to cope with and to colleges, etc. This automated technology is flexible and even reduces environmental impact to some extent as lots of papers can be saved. It also holds more data. As RFID costs are moving down nowadays, and efficiency is rising and libraries are improved similarly. This system is taking off in many places like shopping malls, libraries, tracking wildlife management, office buildings, etc., and changing work lives with new ideas to usher in a bright future.

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