Smart Biometric Attendance and Monitoring System

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Abstract— Now in the recent era of attendance system, attendance system is playing a vital role in schools and colleges. Schools and colleges are trying to improve their attendance system day by day. Most of the students are being absent to colleges without intimating their parents. Their parents are unaware of the absenteeism. Keeping these things in mind and in order to overcome the situation [1], RFID based automated attendance system has come into existence. Earlier days RFID technology with BIO metric based was used where he/she can flash the id card and take biometric without attending classes, during the start and end of the College timings. There is a drawback with this system as the attendance is being marked for the entire without attending the classes, which is not an idle situation. In order to have more robust automated attendance systems and to overcome the present situation, we have come up with a new technique of GPS based technology embedded with RFID and Biometric technology. With the advent of a new technique, we can insert GPS based chip in the student's id card. If any student flashes his or her id card and takes biometric without attending classes and trying to leave the college campus, based on the new technique, we can identify the existence of the particular person. Initially, we have to store our college location (specific location) in a microcontroller. If he/she is not in the college, the microcontroller will send a message to the parents or respective staff. This work is intended to develop a safe and secure student attendance monitoring and also the student's location by the use of RFID, Bio Metric and GPS based technology. So based on this method message will be sent to respective student's parent who is absent and not attending the college and similarly to the respective computer Staff.

Keywords—RFID, GPS, MICROCONTROLLER, GPRS, BIO-METRICSENSOR

I. INTRODUCTION

The remote monitoring system is a real-time monitoring system that monitors the system from a remote location. The oldest method of taking attendance by calling names or signing on paper takes time and it is not a proper procedure, hence inefficient. Radio Frequency Identification (RFID)[2] based attendance system is one of the solutions to address this problem[. This system can be used to take attendance for the student in school, college, and university. Its ability to exclusively identify each person based on their RFID tag type of ID card make the process of taking the attendance simpler, faster and secure as compared to the oldest method. Students only need to place their ID card on the reader and their attendance will be taken immediately. With the real-time clock capability of the system, attendance taken will be more precise since the time for the attendance taken will be recorded. After swiping the RFID card he/she must put a thumb over the fingerprint scanner, the fingerprint is compared against a list of pre-registered users and once it is matched, the individual will be registered as attended for college but some students are misusing these facilities.

She/he can flash the id card and take biometric during the start and end of the College timings without attending classes. Hence there is a drawback with this system as the attendance is being marked for the entire session without attending the classes, which is not an idle situation. There will not be close monitoring of students with this system and hence in order to have more robust automated attendance systems and to overcome the present situation, we have come up with a new technique of GPS based technology embedded with RFID and Biometric technology.

II.SYSTEM ARCHITECTURE

The proposed system contains two diagrams shown in figures. The System mainly consists of two modules one module which called master module which reads the student data from RFID and biometric data from fingerprint sensor, this module also contains LCD display which shows the details of the student this module programmed by embedded c language; and another module which is called student module it is fixed at the student id card this module contains GPS chip and GPRS chip and RFID and microcontroller.

The two devices are communicate with each other and the student module stores the GPS information and the master module stores the bio-metrics and RFID information[2].

III.SYSTEM OPERATION

With the brief literature review, we found that the new advance system should overcome the stated limitation also system should Provide attendance of the student. In that case, a series of problems in attendance are coping up and there is a need to develop System which enables new technology i.e; GPS based technology which is introduced here. If any student is absent for college or sometimes not attending the classes he/she just swipe the card and take fingerprint beginning and end of the session of the college[3]. We can identify his/her existence based on the GPS chip. And also takes quickly send messages to parents and respective staff members. So this information contains real-time attendance and absent status of the student from their respective parent's as well as respective staff. Some of the advantages of GPS based chip technology is used given below.
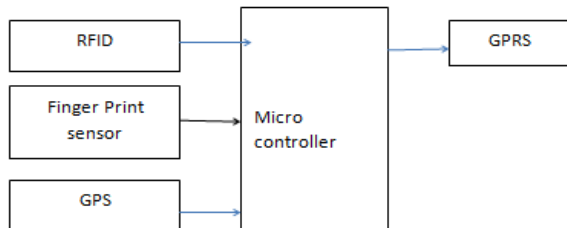
We can get exact information about students existence which means that without attending the classes if he/she goes anywhere, by using microcontroller from a stored location (college location) we can find out there existence. If any kidnapping or any accidents or absconding, it occurs we can identify them basing on the GPS Chip. The amount of time saved through the implementation of the monitoring system. Hence apart from the attendance system, we can also track the student's existence at any time at any given point.

IV. SYSTEM COMPONENTS

Microcontroller:
The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-

effective solution to many embedded control applications The AT89C51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The Power-down Mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.
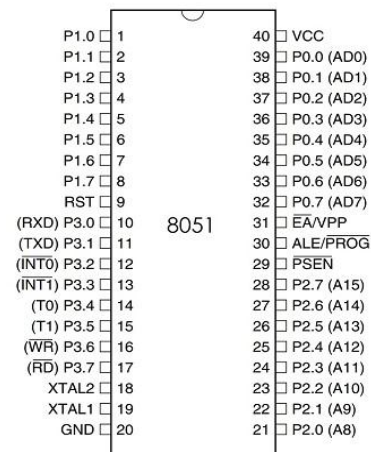
RFID:
RFID or Radio Frequency Identification System is a technology-based identification system that helps in identifying the objects through the tags connected to them, without requiring any light of sight between the tags and the tag reader. All that is required is radio communication between the tag and the reader[4].

RFID tag: It consists of a silicon microchip attached to a small antenna and mounted on a substrate and encapsulated in different materials like plastic or glass veil and with an adhesive on the back side to be attached to objects.
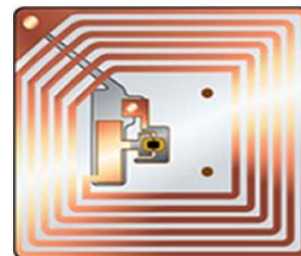
A reader: It consists of a scanner with antennas to transmit and receive signals and is responsible for communication with the tag and receives the information from the tag.

A Processor or a Controller: It can be a host computer with a Microprocessor or a microcontroller that receives the reader input and process the data.

FINGERPRINT SENSOR:

Biometric concept to assist the attendance system in educational institutes. It uses the most consistent way of exclusively identifying students through fingerprint reading[5]. Such type of application is very beneficial in school as well as in college for daily attendance. Through this application, we can keep an efficient track of student's attendance. The project needs a fingerprint reader for finger detection[6]. Using Finger detection technique Every student can login to the system. The fingerprint[7] of the student is matched with the one stored in the database and if it matches then attendance is marked for that particular student. The system also generates an ephemeral report of attendance from the database according to subject-wise or date-wise as required. An absentee list can be generated through a system.

GPS (Global Positioning System):

The app requires to know where you are before it offers guidance. It does this using GPS, a technology based on a series of satellites orbiting the earth some 12,000 miles up. The satellites were placed into orbit by the U.S. DOD, but despite originally being intended for the military, the US government made the technology available for civilian use during the 1980s.

There are 24 satellites (with an additional three orbiting on standby - just in case), although your phone's GPS only needs to receive signals from a fraction of them at any one time, with three satellites enough for your smart phone to calculate a 2D position and track your movement. Four or more enables a 3D position, adding altitude to latitude and longitude, and allowing for more effective tracking.

GPRS:

GPRS stands for General Packet Radio Service. It is a non-voice wireless Internet technology that is very popular due to the fact that it can support both phone calls and Internet data transmission. GPS stands for Global Positioning System which can track different sites on Earth as it receives data from satellites[8], while GPRS connects with the cell sites for signals to provide service for cellular phones[9].GPRS technology is an elegant solution for network providers to offer additional services with minimal effort[8]. Cell phone network providers only need to set up a few new infrastructure nodes plus some software upgrades while still using their existing GSM[9] network infrastructure to add an overlay GPRS network to their cell phone service. GPRS is the technology that many GPS tracking devices are utilizing in order to get the minute information with tracking. Once the GPS device records the data it can then be transmitted through GPRS to another central location such as a computer or through an e-mail. It is the GPRS technology that allows for real-time updates to GPS tracking systems. It is this direct GPRS connection that gives the user of the GPS system the most reliable data available on the market today.

V.RESULTS AND DISCUSSION

The whole system uses the passive RFID system and Fingerprint sensor. As the RFID card (tag) is swiped against the RFID reader at the entrance of classroom[11], and at the same time, he/she may take fingerprint by using fingerprint sensor a carrier signal of 125 KHz is send to the tag coil, which receives this signal and modulates them. This modulated signal is received by the reader, interfaced to the microcontroller. The microcontroller receives this data and is programmed to compare it with the data in the existing database. If the data matches, the relevant details of that particular person is displayed on the LCD interfaced to the microcontroller and also saved in the computer.

BLOCK DIAGRAM OF CLASS ROOM BASED ON RFID READER AND FINGERPRINT SENSOR:
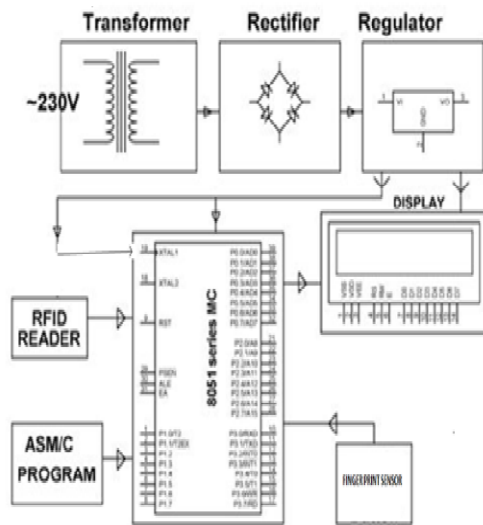
BLOCK DIAGRAM OF STUDENT SYSTEM:
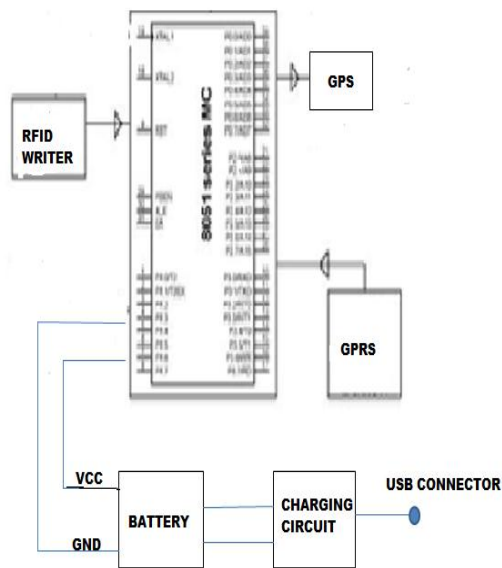
He/She can flash the id card and take biometric during the start and end of the College timings without attending classes.After sending student or user data to the classroom machine, it checks and verifies, if it is correct then the GPS module activates else it is indicated that it is false information[12]. The Stored address location(current location)is checked with the GPS[14] location. Now if the variation is more than the stored address location than that information will be send to the parent or a Particular person of college staff through GPRS stating the existence of the student. This gives an active existence of the student's location within the college timings. A copy of these details (location) is sent.

VI . CONCLUSION AND FUTURE SCOPE

The main conclusions of the study may be presented in a short Conclusion Section. In this section, the author(s) should also briefly discuss the limitations of the research and Future Scope for improvement.

This paper is dealt with the robust method of the attendance monitoring system. This system takes attendance for schools/college students in daily life, uses RFID, Bio Metric and GPS based technology for safe and secure student attendance monitoring and also student's existence which provides close monitoring of the student and interns makes student attend classes regularly which eventually increases the pass percentage for the college and also paves the path to their carrier[6]. Although there are numerous methods of detecting student existence and their absenteeism in college our system is the more robust, very easy and convenient system at the college /University level[8]. We also used GPS technology which will give a lot of scope for further modernization with rapidly advanced tools [9].

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