Automatic Attendance System

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Abstract: As we have come across many inventions to reduce the human efforts and already many systems have been introduced to do so. The specialty about this system is that in this system the chances of proxies reduces since the PIR(Passive INFRARED) sensor installed in the class will scan the number of heat signatures in the class first then accordingly the teacher will take attendance. This system uses the RFID (Radio Frequency Identification) chips that will be already placed inside the ID card in order to make the process simpler.

Index Terms: RFID, PIR sensor, Attendance, Arduino ATmega 328

I. INTRODUCTION

In today's world the technology is excelling in every field developing with high rates than we can imagine it to be. From smart home appliances to wearable technologies like smart watches, etc. The new trend is where people create something by which their time and efforts reduces and they get their work done on time too. During classes sometimes teachers loses his/her the track of time and when taking attendance at the neck moment brings out chances of students giving proxy to their friends. To eradicate the system of proxy and tightening the system, and also to make it user friendly available for the teachers we have proposed an automatic attendance system that saves up a lot of time and the attendance gets over very quick. And if some student tries to give proxy they will be caught red handed and further severe action will be taken against them. Also if by any chance proxy is been given it, it can detected with this device which is a combination of PIR sensor and RFID. In this system the PIR sensor that scans for the heat signatures will alert the respective teacher in a given interval of time about the present students count identified using it and the counts is also expected from RFID reader. The attendance is taken from the RFID reader where the chips are mounted in the student ID cards which will be given to them in the start of the college. The comparison of the number of counts from RFID reader and PIR sensor is noted and is compared. The coding is done though matlab to compare the counts from both the separate devices and is expected to be similar. If it's not so, the buzzer is turned on to inform the teacher about the respective counts being mismatched. It is almost the same kind of like an alarm system which is when turned on when something goes wrong.

II. LITERATURE SECTION

In the section we shall look at the features of how the system works. This whole system starts working only when the respective teacher gives her set of permission to start the system on counting and recording the attendance. Without his/her knowledge the device cannot be switched on. PIR sensor is a type of IR sensor which reads the thermal change present in the enclosed area where the device is kept. Teachers mobile will be connected to this system through the server where the attendance will be updated. During the class, the PIR sensor will keep scanning for the heat signatures in the classroom also it will keep updating the results. When it is time to wrap up the class, five minutes before the period is about to end, the faculty will receive a notification through the server about the results. If incase all are present, then there is no requirement to take the attendance. Now, if some students are absent in the class the rest of the students will have to put their ID card onto the RFID reader which scans the tag that is embedded into their respective ID card and the unique number which the tag contains will be directed to the server and the students are identified from it and is marked present for the respective class. RFID reader is a device that reads the information through the chips or tags that has been placed in their ID cards. In RFID reader when the chip or tag is scanned the signal that is sent by the RFID reader to the chip or tag can be detected from a long distance as well and the chip or tags converts the signal energy to power energy and stores the information in the server, as for the functions of the RFID reader once it scans then it will directly upload it to the server. If any changes have to be made it can be done only by the faculty within 24 hours of the attendance.

The RFID reader is connected with the arduino, RTC and PIR sensor on a breadboard through jumper wires. Since the arduino has 28 pins it makes more convenient to use. After all the connections are done the arduino ATmega328 is connected to the laptop or a Desktop and the codes for arduino will be executed. The RFID will be connected to the server which will be read and further coded through the matlab which will compare both the RFID count with the PIR sensor count and only if the counts of the both devices match the buzzer will be turned off. After the comparison, if the count is not same then the buzzer will be set to on state and the faculty will get the notification. Further some actions against the person who has given the proxy will be taken. The RTC is supported by the arduino ATmega 328, which stores the data of the students attendance and then since it has EEPROM of 1KB, that makes it more reliable to store and erase it after an amount of time.

Not just the RTC module, every component in this system is connected to the arduino ATmega 328 including the power supply. The mechanism behind the data being

registered in the system of the students as well as the respective teachers will be done in the server. With the help of RTC clock faculty will identify which period is happening at that particular slot as it keeps track of time, day, date, month and year. The major components in this automatic attendance system are RFID reader, PIR sensor, arduino ATmega 328 and the RTC.

III. PROPOSED SYSTEM

In this system we have designed an approach to eradicate the system of proxy which acts as a method to tighten the system and to maintain discipline. In order to strengthen this system, severe actions should be proposed against the students who try to give proxy. Also it helps the faculty to concentrate better without worrying about the time since a notification will be sent to them at the end of the attendance session. Now, the RFID reader will scan and upload the details of the students on the server. And with help of PIR sensor, RTC respective counts are taken which will be further uploaded to the server. The PIR sensor and RFID's counting are expected to match for the verification of the number of students attending the particular lecture. The coding for the inbuilt mechanism to happen as well as to read the devices Matlab coding is been proposed. Further it's been converted to the embedded format for further applications. Both these components will determine the attendance with the help of arduino Uno. Once these processes gets over the faculty will get the notification that the attendance has been taken and there are no proxies. After that, the faculty can switch off the whole system can move onto the next class and follow the same procedure to take the attendance which is quite convenient to follow since not much works has to be done for this process.
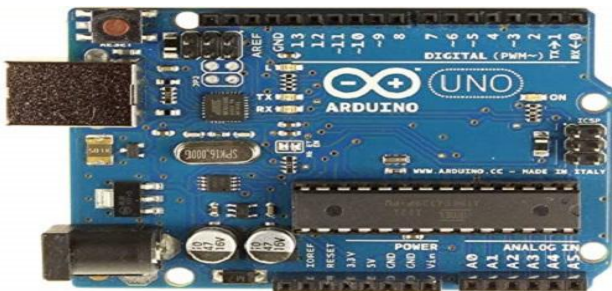
IV. SYSTEM ARCHITECTURE

Figure 4.1: Arduino ATmega328.

This microcontroller AVR will be taking care of this system and since it has 8bits and 28 pins the connections are done quite easily. In this system the arduino is coded using matlab which enables it interact with RFID even if it is not connected with a PC or Desktop.

Figure 4.2: PIR sensor.

It is a PIR sensor that can detect any objects that has motion within the given range which can be adjusted it ranges from 5m-12m. This device can the motion objects but in the form of heat signatures. In this system it is counting the heat signatures and will give the notification for it.

Figure4.3: RFID Reader

This is a RFID card reader that converts the energy signal into power signal from tags or chips. In this system this card reader will take the energy from the RFID and the tags or chips will convert it into the power signal and then will save the details before uploading it to the server.
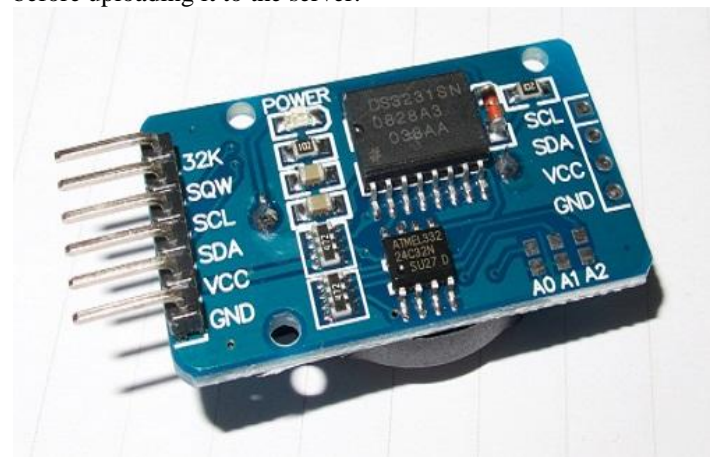

Figure 4.4: Real Time Clock.

This is a module that keeps record of the time, date, week, month and year including the leap year. Also it works very conveniently with power supply. In this system it will allow the student for attendance only if they are 5-10 minutes late to the class or else it will not be entered unless the faculty allows it.

Figure 4.5: Buzzer.

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This is known as Buzzer, this module buzzes when something is wrong with the system and it needs to be rectified. In this system this buzzer will be left on for a given interval of time when the number of heat signatures doesn't match with the number of student details that has been uploaded through the RFID reader.
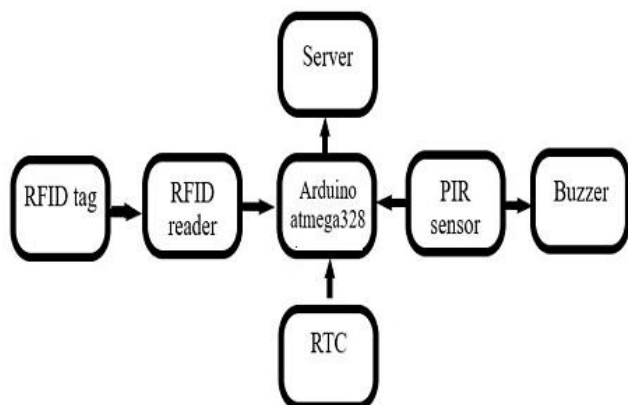

Figure 6: Block Diagram.

V. CODING

A. Model of transmitter

The coding is done in Manchester coding. The transmitter should satisfy the protocols and should support DSB or SSB and should return un-modulated carrier signal.
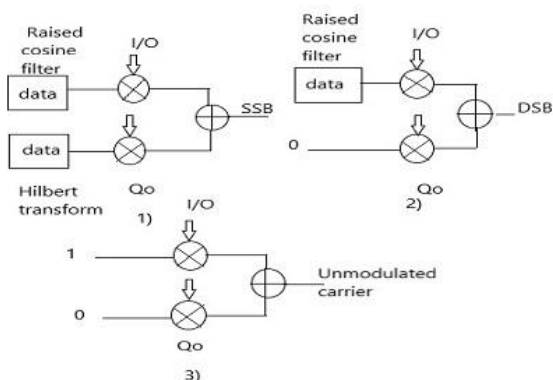

Figure 5.1: Block diagram for the transmitter and Receiver.
BER evaluates the performance of digital communication system.

1) Raised Cosine Filter

A band signal should satisfy Nyquist criterion and is realized in raised cosine filter.

2) Quantization

The Signal is sampled by raised filter and Hilbert transform. The digitalized system is sent to analog part. DAC is used to convert digital signal to analog signal and that causes quantization error. The low pass filter which is applied after converter smoothens the waveform and lowers the higher order harmonics.

B. Model of Receiver

1) Antenna

The antenna is of two configurations, 1 antenna or 2 antennas, these antennas come with a circulator. The receiver gets the response from the chip whereas the transmitter keeps sending the waves in order to boost up the chip.

The direct coupling between TX to RX using 1 antenna more than the 2 antennas because the isolation performance is low for the circulator.

2) Filter

A high order low pass filter is used so that the band can be suppressed to its required level. This filter is 5th order Butterworth and this is used because of the flatness that happens in the pass band, also it is the perfect fit for amplification modulation.

3) Direct Conversion

The DC offset is larger than the signal and can saturate the amplifier when not removed therefore direct conversion is used in the receiver for multi-protocol operation.

4) Base-band DSP

To decode the signal from ADC the base-band DSP is required. Also to get the best performance from BER the base-band DSP should unite signal power of I/Q branch for accelerating the signal power.

VI. FUTURISTIC SCOPE

For the system which we have proposed, have for sure reduced the efforts very much along with saving us lots of time because even now in many schools and colleges records of students are being maintained for attendance which is a hectic task to do. This system will surely decrease time spent on taking attendance and also can save such hectic records which is been maintained on the students. Another aspect we need to look is that in future they can develop and update this system into using nanotechnology or IOT and implement in many schools and colleges.

VII. CONCLUSION

The system that has been proposed here can be a very efficient way to take the attendance in schools and colleges and can be very useful as well because the components required for this system are cost profitable and working on it is safe and also it is easily accessible. Further with new technologies we can combine the proposed system and can make it further more efficient in usage.

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