Attendance Monitoring and Power Management Intelligence Class Room

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Abstract

Now-a-days intelligent automation has stepped its presence in every field all over the world. Our project has a stepping in the attendance and power management of the classrooms in the colleges/schools. We are providing the attendance system using image processing technique in that the face recognition system. This system use PCA algorithm and form eigen vector by registering the face images. In the enroll process we need to give the face images and the name of the student. After training, when we give a face image, it will recognize by using the eigen values and register the attendance of that student in the database. The use of low cost technologies for highly reliable applications with the help of newly innovated algorithms makes the automation process to reach the consumers at cheaper and reliable cost. Thereby in our project IR sensors are used to maintain the attendance and power management. The safety of the power management is increased by utilizing power driver switching. The class room unit displays the strength of the class room and also control the lights should not be switched on without anyone in the class room. A master controller displays all the class rooms status and saves it in database.

Keywords - *Attendance monitoring, Image processing technique, student attendance, Power management, Automation.*

I. INTRODUCTION

In this paper the counting is taken as the action of going regularly in and out as well as monitor the absolute count value of the object or a person[1]. The manual counting system is not an efficient way as more time is required to record as well as count each, present inside the room and this counting process cannot even sync with the power management of the building. An Automatic attendance management system will help in saving time and money by eliminating a great deal of manual processes involved in counting and saves many hours attended for counting. Our new system can also feed the output to the power management entity so that at right time right amount of power is feed to that building. We install our system in college premises it automatically count the number of persons in the class room so that teachers can more accurately and quickly track student's timing in the classroom as well as it provide the real time temperature to the air conditioning systems so that they can effectively regulate the temperature of that class which in turn save power.
The remainder of this paper is organized as follows.
The following definitions related to this study are:

II. PROBLEM DEFINITION

The attendance monitoring and power management issues not only faced by the companies and industrial areas. It plays a same role in the educational institution also. Due to the attendance issues the faculties faces the lot of problems in the colleges/school in every day. For this system we can use man power, for collecting the date base of student attendance list. Sometimes it leads to error. Due to the error there is a miscommunication between the faculty and parents. Through this idea we can monitor the class room condition also. If the class room fully automation means it's one of the benefits of the institution.

In power management concept, due to the wastage of power in the institution pays annually average amount of 6 laths. Its half of amount generate by the wastage of power in the class room. Due to the carelessness we face lot of problems indirectly. Hence overcome this problem we came up with an innovative project of the attendance monitoring and power management intelligence class room. This concept is designed in such a way that the students and faculties are not in the respective areas the lights and fans will be automatically disconnected. From the attendance monitoring concept, we can kept the students attendance data base properly. This project is designed to giving the solution for basic problems surrounded by us.

III. IDEA/CONCEPT/SOLUTION TO ADDRESS THE PROBLEM

We learnt about the concept of automation and power management and decided to create automatic light and fan working using sensors and attendance monitoring using image processing technique model, now a day's intelligent automation has stepped its presence in every field all over the world. Our project has a stepping in the attendance and power

management of the class rooms in the colleges/schools. The use of low cost technologies for highly reliable applications with the help of newly innovated algorithms makes the automation process to reach the consumers at cheaper and reliable cost. Thereby in our project IR sensors are used to maintain the attendance and power management. The safety of the power management is increased by utilizing power driver switching. The class room unit displays the strength of the class room and also control the lights should not be switched on without anyone in the class room. A master controller displays all the class rooms status and saves it in the database.

IV. CONCEPT OBJECTIVE

An attendance monitoring and power management is an innovative idea in classroom which makes the class room as automation which reduce the manpower before use manual attendance system. This is implemented using image processing technique and basic components like sensors and microcontroller. The working of this project is very simple, IR sensors are placed in each corners of class room and entrance of the class room while the students enter into the class room through the image processing technique the students attendance data base will be sent to the class in charge which are connected to PC of class in charge. So when the students present attendance list, absentees list, late comer list will stored in the respective column of data base. When the students not present at timing exceeds set limit then automatically sends message to class in charge and family member. Through idea we can reduce the stress and miscommunication of faculty with family members.

Through the power management idea we can reduce the cost of the electricity bill of institution moderately, we can save the power in each and every class room of the institution.

V. METHODOLOGY

Our proposed concept is divided into two distinct parts. One is the attendance monitoring part another one is power management part. These distinct parts methodology can be explained below.

4.1 Attendance Monitoring using Image Processing technique.
4.2 Power Management using sensors.

A Attendance Monitoring Using Image Processing Technique

In this system microcontroller is used. In this the student's data base will be enrolled. When sensor is placed in the entrance of the class room, the high resolution camera will capture the face and compare by using image processing technique. If the picture matches means the student will be present that data will stored to the present list. If the student came after 10 A.M the data will be stored to the late comers list, the student will not come until 10:30 A.M it will be stored to absentees list. After this timing the entire data will be sent to class in charge PC and also the class room LED monitor. From the class in charge that information will be sent to the parents. In this data base student's time in and time out data will also be stored.

B. Power management using sensors

In power management concept, the sensors are fixed in the corners of the class room, these sensors moreover covers students sitting areas. If the students when enter into the class room based upon the density area that side fan and light will be turn on , if the load increased means the lights and fans will be turn on. If the students not present in class room means the fans and lights will be turn off.

VI. CONCEPT BENEFITS

The system of managing attendance is efficient only if it is real time. The automated attendance management system works on all facets with effortlessness and effectiveness. There are many benefits of having an automated attendance management system. Having an automated attendance management system helps in keeping the accurate and reliable data of students in class room. Reduction of man power, getting automated attendance management we can reduce the time of faculties during morning hours and man power also reduced. More over you get error free data base of students without wasting of time. Through this system we can avoid the problems faced by the faculties in every morning.

Power management system it comes to power saving process it can be best implemented with the use of power management system around you. It is the key of saving power in institutions of each and every class rooms. The electricity used to run institution costs 3, 00,000 average per month. Through this project we can reduce the cost of electricity bill in half of the average.

VII. BLOCK DIAGRAM OF PROPOSED SYSTEM

A. Block diagram

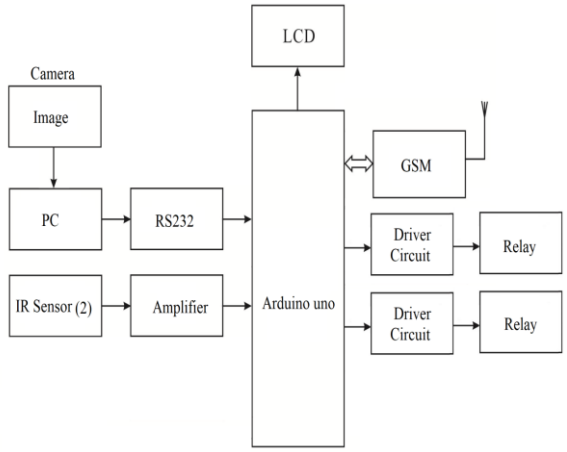

Fig 1: Block diagram for system

B. Block Diagram - Hardware Description:

1. Arduino Uno

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P . It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Technical spec :

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

2. RS232

In telecommunications, **RS-232** is a standard for serial binary data interconnection between a *DTE* (Data terminal equipment) and a *DCE* (Data Circuit-terminating Equipment). It is commonly used in computer serial ports.

3. Driver Circuit

The following circuit will allow you to drive a 12V relay using logic voltage (an input of 4V or greater will trip the relay). The circuit has its own 12V power supply making it self contained but the power supply portion can be left out if an external supply will be used. The circuit shows an output from the power supply that can be used to power other devices but it should be noted that the supply is unregulated and not particulary powerful with the parts stated. The 12V DC output is suitable for powering a few LEDs or low voltage lights but should not be used to power other electronic boards or motors.

4. Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

5. GSM

GSM networks operate in a number of different carrier frequency ranges (separated into GSM frequency ranges for 2G and UMTS frequency bands for 3G), with most 2G GSM networks operating in the 900 MHz or 1800 MHz bands. Where these bands were already allocated, the 850 MHz and 1900 MHz bands were used. Regardless of the frequency selected by an operator, it is divided into timeslots for individual phones to use. This allows eight full-rate or sixteen half-rate speech channels per radio frequency. These eight radio timeslots (or eight burst periods) are grouped into a TDMA frame. Half rate channels use alternate frames in the same timeslot. The channel data rate for all 8 channels is 270.833 kbit/s, and the frame duration is 4.615 ms.
The transmission power in the handset is limited to a maximum of 2 watts in GSM850/900 and 1 watt in GSM1800/1900.

C. Software Description

1. Arduino Software (IDE):

a. Writing Sketches :

Programs written using Arduino Software (IDE) are called sketches.

- File
- *New*

  Creates a new instance of the editor, with the

bare minimum structure of a sketch already in place.

- *Open*
  Allows to load a sketch file browsing through the computer drives and folders.*Open Recent* Provides a short list of the most recent sketches, ready to be open
- Verify/Compile
  Checks your sketch for errors compiling it; it will report memory usage for code and variables in the console area.
- Upload
  Compiles and loads the binary file onto the configured board through the configured Port.
- Upload
  UsingProgrammer ,This will overwrite the bootloader on the board; you will need to use Tools > Burn Bootloader to restore it and be able to Upload to USB serial port again. However, it allows you to use the full capacity of the Flash memory for your sketch. Please note that this command will NOT burn the fuses. To do so a Tools -> Burn Boot loader command must be executed.
- Export Compiled
  Binary Saves a .hex file that may be kept as archive or sent to the board using other tools.
- Show Sketch Folder Opens the current sketch folder.
- IncludeLibrary
  Adds a library to your sketch by inserting #include statements at the start of code and run it.

VII. CONCLUSION

The present paper proposes a flexible and real-time face recognition-based mobile attendance management system. A filtering system based on Euclidean distances calculated by Eigenfaces has been developed. The proposed system eliminates the cost for extra equipment, minimizes attendance-taking time, and allows users to access the data anytime and anywhere. Smart devices are very user- friendly to perform classroom attendance monitoring. The people counter we have designed is based on digital circuit design therefore memory requirements due to this system are quite low. Sensors used for this system need to be established and placed very carefully so that it gives flawless signals about the movement of the people. As it is a completely real time process, so real time operations support this system. We can eliminate some assumptions we have made to operate this system by improving the sensing elements to a whole new advanced level.

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