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ENERGY CONSERVATION AND DIGITAL SECURITY NOTICE BOARD FOR SMART CLASS ROOM

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Abstract - *In current scenario everything become in digital form. The aim of this research is to design and implement a new approach by providing an application and automated system for monitoring student attendance by using both RFID and fingerprint bio metric technology and energy management by using IR sensor. The entering human will be counted then that count is displayed on the smart notice board. In this concept also providing security during lab hours, library hours and etc. With the help of surveillance motion capture camera using raspberry pi and a web camera. This device also monitor the room temperature and human count according to that light and fan will be turn on and turn off. This feature in the device is used for the power saving. The circular or information from the college or school management will be automatically updated in the smart display by using GSM (Global system for mobile communication).*

Key Words: RFID, Fingerprint module, GSM, Raspberry pi, Camera, IR sensor, Temperature sensor, LCD display.

1. INTRODUCTION

Even though all the peoples are living in 20th century with so many innovative technologies. The aim of this concept is to design and implement a new approach by providing an application and automated system for monitoring the student attendance by using both RFID and fingerprint bio metric technology and energy management.

Now, there are many universities around the country and each university contains up to 10 thousand students. Attendance plays a major role in educational institutions, IT companies, industries and etc. The lots of university still using manual process attendance system. Manual process means when starting the class, the lecturer will give a piece of paper to the students then that students are checking the presence of their names and then be signed. At the end of the class, the lecturer will take back that paper and keep it as a record. The paper attendance will easily damage then it also has so many disadvantages. For example, other students signed for their friends.

In this concept develops a reliable attendance recording system based on bio metric and RFID. In this concept, Fingerprint module as a bio metric. The fingerprint module and RASPBERRY PI to take and keep attendance data and records. By using fingerprint sensor, the system will become more secure for the users. Then RFID is also used for taking the students attendance. Whenever the RFID tag is placed near the reader, it will take the attendance. The above student's attendance details are displayed on the smart notice board. By using IR sensor, the entering human in the class room will be counted then that count is displayed on the smart notice board. According to that count the light and fan in the class room will be automatically turn ON and turn OFF. By using the temperature sensor, the light and fan in the class room will also automatically control based on the room temperature and climate. This feature in the device is used for the power saving of the organization.

The circular or any information from the college or school management will be automatically updated in the smart notice board by using of GSM (Global system for mobile communication) module. It also displays the available status of the HOD/Principle are being in their cabin.

In this concept also provides security during lab hours, library hours and etc, with the help of surveillance motion capture camera using raspberry pi and a web camera. For example lab, library and PET hour will start from 10 to 11'o clock. At the particular time the surveillance motion capture camera will be automatically turn ON but it's not record what will be happening in the class room, when somebody entering in to the class room on that particular time the surveillance motion capture camera will automatically record what will be happening in that class'

room. The main objective of this concept is to monitor the attendance of students, energy consumption and provide the security for the class room and industries in a more effective way.

2. EXISTING SYSTEM

Here many existing system prepared for making this concept. The most of educational institution, industries and companies are still using the separate devises for the attendance monitoring, timetable telecasting, security purpose, information passing and automatic device controlling. These kinds of separate devices are occupies the larger space and also it need the large amount of power consumption then it also have the lot of disadvantages. The one of the main disadvantage is it tacks the high cost to making these devices separately.

3. PROPOSED SYSTEM

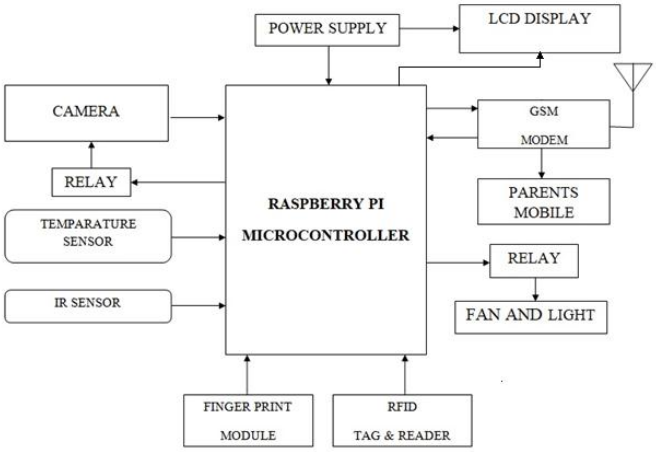

Figure 1: Block Diagram

Here proposing the wireless network concept to display the information in the class without wastage of time by a simple SMS using GSM technology moreover to display the time table like lecturer's name, subject name. In this concept also implemented the smart attendance system based on the bio metric and RFID technology with the help of RASPBERRY PI. The man power and time is saved by this concept. IR sensor and temperature sensor are used in this concept. By using IR sensor the entering human in the class room will be count. By using temperature sensor, the climate of the class room will be sense. According to that count and climate the electrical load (Fans & Lights) in the class room will be automatically control. Here this system is used for power consumption purpose. This concept also providing security during lab hours, library hour and etc.., with the help of surveillance motion capture camera using RASPBERRY PI. By this concept can observe smooth conduction of class work with information to the head of the department/ Institution and industries.

4. HARDWARE REQUIREMENT

4.1. Raspberry Pi

Raspberry Pi is a low cost (35 dollar), credit card sized, computer that performs various applications. Some of its main features include 1GB of RAM, 4 USB Ports, General Purpose Input Output pins, Linux support. These features give programmers a wide range for diverse applications.

Figure 2: Raspberry Pi

4.2 Raspberry Pi-Camera

Raspberry Pi-Camera module is an 8MP camera with full HD recording capability. This provides a perfect solution for face recognition.

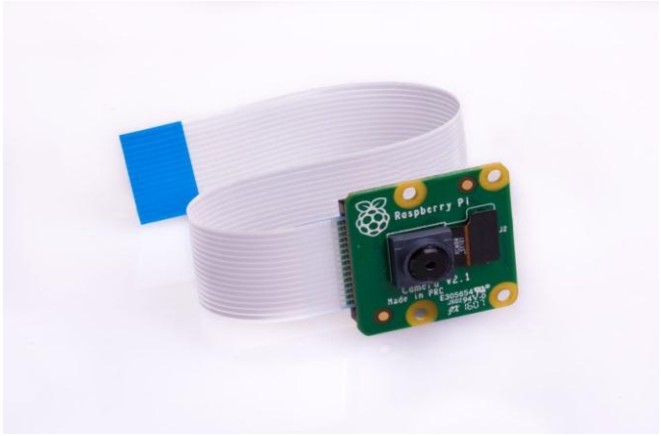

Figure 3: Raspberry Pi-Camera

4.3 GSM Modem

GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 application.

Figure 4: GSM Module

4.4 Fingerprint Module

Biometric identification from a print made by a impression of the ridges in the skin of a finger is often used as evidence in criminal investigations. This is an optical biometric fingerprint module with TTL UART interface for direct connections to a microcontroller UART. The user can store the finger print data in the module and can configure it in 1:1 or 1:N mode for identifying the person. This module can directly interface with any 3.3V or 5V microcontroller.

Figure 5: Fingerprint Module

4.5. RFID tag and reader

Radio frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader.

Figure 6: RFID tag and reader

4.6. Temperature Sensor

Temperature sensor is a device; to measure the temperature through an electrical signal it requires a thermocouple or RTD (Resistance Temperature Detectors). The measurement of the temperature sensor is about the hotness or coolness of an object. The working base of the sensors is the voltage that read across the diode. If the voltage increases, then the temperature rises. If the difference in voltage is amplified, the analogue signal is generated by the device and it is directly proportional to the temperature.

Figure 7: Temperature Sensor

4.7. IR Sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. This sensor is analogous to human's visionary

senses, which can be used to detect obstacles and it is one the common applications in real time.

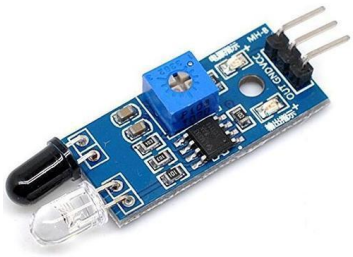

Figure 8: IR Sensor

CONCLUSION

In this concept, Developed the model of digital notice board system and security system with the help of Raspberry pi connected to it. Moreover that notice board having the attendance details, circular information, timetable and available status of the HOD/Principal are being in their cabin then also in this concept, Developed the surveillance motion capture camera based security system. The security system is an efficient way for monitoring suspicious activities. However, energy consumption is more when the system is continuously powered on. Proposed raspberry pi based surveillance system provides energy management by turning the system ON, based on the occurrence of a particular motion. In this concept the electrical load will be automatically controlled by the help of sensors. This system has a lot of advantages such as simple structure, low power consumption, low cost and stable. This proposed system has much upcoming application in educational institutions, industries and IT companies etc.

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