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RFID Based Attendance Monitoring and Photo Capturing with Date and Time for Colleges

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Abstract-The project aims at designing an intelligent security system for recording the attendance in colleges, firms etc..,. The proposed system makes use of RFID technology for recording the attendance. The system captures images of students and saves the attendance along with enter and exit date and time. The Intelligent system proposed makes use of both Embedded and MATLAB to achieve the task.

I. Introduction

The face plays a very important role in our social interaction, conveyance of title people's identity. Exploitation the face as a key to security, face recognition technology has received important attention within
the past many years thanks to its potential for a good style of applications in each social control enforcement and non-law enforcement. A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source. One of the ways to do this is by comparing selected facial features from the image and a facial database. It is typically used in security systems.

II. Literature survey

Normally in schools and colleges, the average student's count will be 50-80.Teacher has to mark student's presence for every hour. Traditionally, student's group actions area unit taken manually by mistreatment attendance sheet given by the college members at
school, that couldbetime overwhelming event.Moreover, it's terribly tough to verify one by one student in a very massive schoolroom atmosphere with distributed branches whether or not the documented students are literally responding or not. Mistreatment typical technique of vocation out names takes around 5-10 minutes for marking group action of entire category for marking attendance of entire class. It becomes complicated when strength is more. To overcome the traditional method, an automatic RFID based attendance system came into existence.

III. Existing System

Existing system for taking Attendance for Students are either biometric or Iris recognition system.[1] Both are high in cost and also to maintain these systems is also difficult. There may be chance of making fake attendance by manipulating the system. The students can be place their fingers for attendance and can go out without entering into class.[3] There will be issues in detecting finger prints because of glass placed on the sensor.

IV. Proposed system

The proposed system is to capture the images of students and it will be store into the computer along with student's entry and exit time using MATLAB software. The main disadvantages in Existing systems are they can be give attendance to the students irrespective of staying in class. To over come this problem we proposed this system. The system Gets input from RFID reader and send data to microcontroller. The microcontroller sends this

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information to MATLAB through RS232 communication to capture images. MATLAB will be run in computer and when it gets information from microcontroller it will on the Camera of the system and captures the image of student along with Date and time. It will also have the feature of Lecturer Entry and Exit. When the lecturer enters into class he will shows his tag then Attendance of students who were not entered before lecturer will be off until Lecturer Exit tag shown. The system can capable of showing students attendance count on LCD i.e., how many students are entered into class before lecturer enters into class. If there is any invalid tag shown by student then automatically an alarm sound will be generated by piezeo electric buzzer. Different operations being performed can be seen through LCD display. A total number of students will be displayed on alphanumeric display. The Microcontroller is loaded with intelligent program written in embedded 'C' language.

IV. Hardware Description

Micro controller:

Fig: Microcontrollers

Conditions that we asset in today in the field of microcontrollers had their beginnings in the advancement of innovation of integrated circuits. This advancement has made it available to store countless transistors into one chip. That was an essential for generation of microchips, and the first PCs were made by including outer peripherals, for example, memory, input-output lines, clocks and other. Additionally expanding of the volume of the bundle brought about making of coordinated circuits. These incorporated circuits consists of both processor and peripherals. That is the manner by which the main chip contains a microcomputer, or what might later be known as a microcontroller.

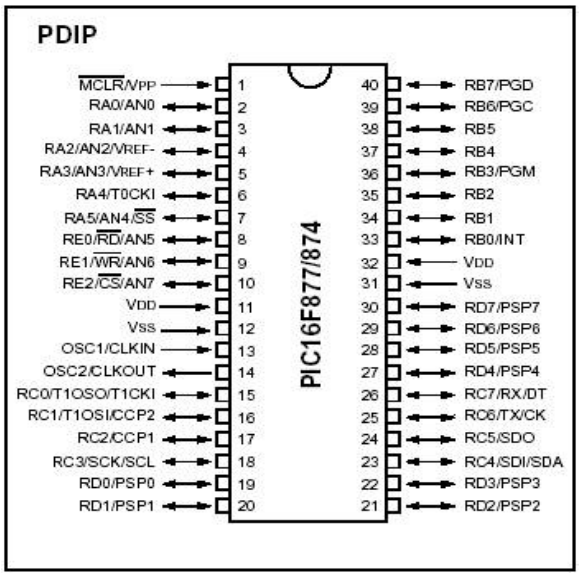

Fig: Pin diagram if PIC16F877A

Pic16f877 is a 40 pin microcontroller. It has 5 ports port A, port B, port C, port D, port E. All the pins of the ports are for interfacing input output devices.
Port A: It comprises of 6 pins from A0 to A5
Port B: It comprises of 8 pins from B0 to B7
Port C: It comprises of 8 pins from C0 to C7
Port D: It comprises of 8 pins from D0 to D7
Port E: It comprises of 3 pins from E0 to E2
whatever is left of the pins are required pins these ought not be utilized to interface input-output devices.
Pin 1 is MCLR (Master clear pin). This pin also referred as reset pin.
Pin 13, 14 are utilized for crystal oscillator to interface with produce a frequency around 20MHz.
Pin 11, 12 and31, 32 are used for voltage supply Vdd(+)and Vss(-)

RFID:

RFID uses a semiconductor (micro-chip) in a tag or label to transfer stored data when the tag or label is exposed to radio waves of the correct frequency.
RFID systems fundamentally consist of four elements:

- The RFID tags.

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- The RFID readers
- The antennas and choice of radio characteristics,
- The computer network (if any) that is used to connect the readers.

RFID Tags

The tag is the basic building block of RFID. Each tag consists of an antenna and a small silicon chip which has a radio receiver, a radio modulator for transferring a response back to the reader, control logic, some amount of memory, and a power system. The power system can be completely powered by the incoming RF signal, in which case the tag is known as a passive tag. Alternatively, the tag's power system can have a battery, in which case the tag is known as an active tag.

Fig: RFID tag inner view

RFID tag format:

Readers

The RFID reader sends a pulse of radio energy to the tag and listens for the tag's response. The tag detects this energy and sends back a response that contains the tag's serial number and possibly other information as well. In simple RFID systems, the reader's pulse of energy functioned as an on-off switch; in more sophisticated systems, the reader's RF signal can contain commands to the tag, instructions to read or write memory that the tag contains, and even passwords. Historically, RFID readers were designed to read only a particular kind of tag, but so-called multimode readers that can read many different kinds of tags are becoming increasingly popular. RFID readers are usually on, continually transmitting radio energy and awaiting any tags that enter their field of operation.

Band Frequency, Wavelength, and Classical Usage

Band	Unlicensed Frequency	Wavelength	Classical Use
LF	125–134.2KHz	2,400 meters	Animal tagging and keyless entry
HF	13.56MHz	22 meters	
UHF	865.5–867.6MHz (Europe) 915MHz (U.S.) 950–956MHz (Japan)	32.8 centimeters	Smart cards, logistics, and item management
ISM	2.4GHz	12.5 centimeters	Item management

LCD DISPLAY:

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

LCD Pin diagram

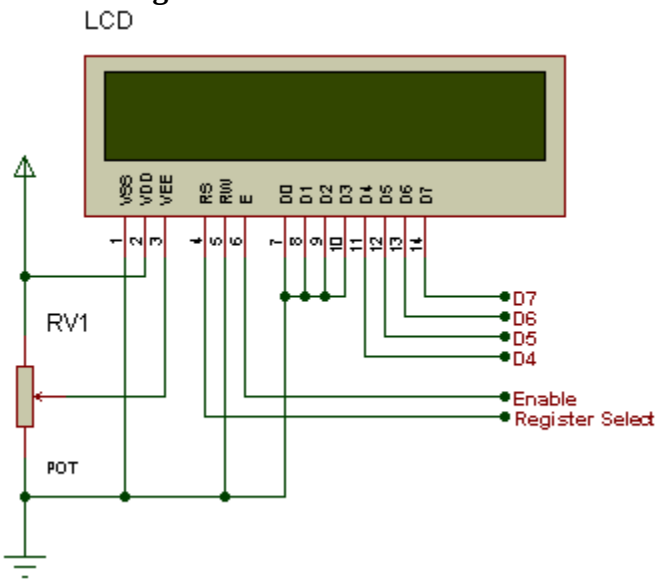

Fig: LCD pins description

The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data

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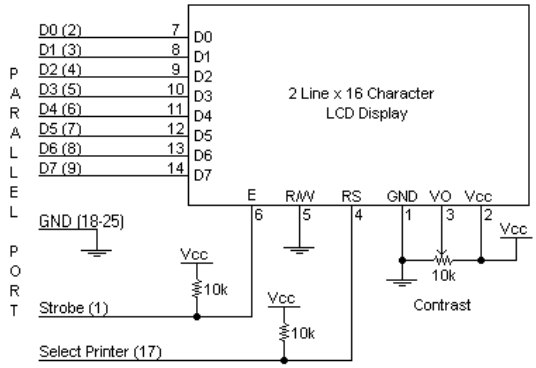
bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus). The three control lines are referred to as **EN**, **RS**, and **RW**.



Schematic of 16*2 LCD display

BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

Fig: picture of buzzer

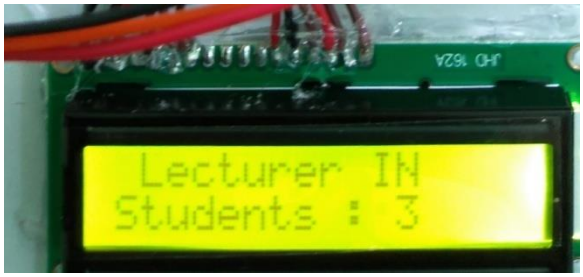
V. RESULTS

1) The below image is taken when we give power supply to the microcontroller the microcontroller is waiting to detect the RFID tag, the information is displaying on the LCD that means the microcontroller is ready to take input from tags. We need to wait until the microcontroller shows this message on LCD screen.

2) After showing the RFID tag the microcontroller shows the Tag number on LCD screen to verify that the card number is correct or not.

3) The details of students are already stored in microcontroller. When the student shows his/her tag then if the tag is valid the student's name and roll number will be displayed on LCD screen.

4) As we discussed when the lecturer shows his tag then automatically the microcontroller displays the number of students entered into class before lecturer comes.



5) When any student is showing his own purchased tag then the data of that tag is not stored in Microcontroller. So the microcontroller displays an Invalid message and also an buzzer alarm can be hear in the circuit.

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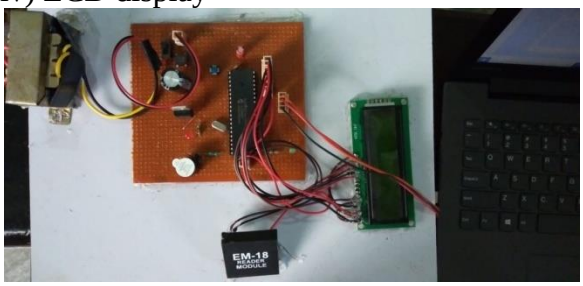
6) In the below image we can see the Hardware components of this project.

i) Transformer

ii) Mother board along with Microcontroller and Power supply section

iii) RFID reader

iv) LCD display



The system was successfully implemented to capture images of students and stores them with date and time. And also Shows students count on 16*2 LCD display.

VII. CONCLUSION AND FUTURE WORK

This system is implemented and tested successfully. Integrating features of all the hardware components used have been developed in it. Existence of every module has been implemented carefully, thus adding to the best working of the unit. Secondly, using extreme working IC's with the help of growing automation, the project has been successfully completed. Thus the project has been successfully designed and tested.

This project can be extended by using face recognition feature, and operating system as the additional security and also can be extended to send the total attendance directly to the server of college by placing Raspberry pi microprocessor.

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