AUTOMATIC WIRELESS COLLEGE BELL SYSTEM USING ZIGBEE

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ABSTRACT:- The aim of this paper is to develop an embedded system for programmable automatic college bell system using zigbee module. In earlier automatic college bell system the speaker are connected using wire to develop automatic wireless collage bell system. The system we developed speakers are connected wirelessly and timing of bell and national anthem are programmable. The transmitter side consist of a zigbee connected to computer and GUI is used to control the timing of bell, national anthem, etc. By using zigbee module computer sends commands to the receiver wirelessly. The receiver consists of controller and zigbee and LCD display. At the receiver signal received processed by the Arduino controller. As per the received signal from transmitter, controller at the receiver take the action and according it controls timing of bell. The main benefit of our system is it is wireless and hence receiver position can be changed anywhere in the prescribed region. The future work is to increase the distance between the transmitter and receiver.
Keywords: GUI, Embedded system, Zigbee module, Arduino controller etc

I INTRODUCTION:

A bell is a percussion instrument used in schools that tells the students when it is time to go to class in the morning and when it is time to change classes during the day. Typically, the first bell tells the students that it is time to report to class. The bell is an important instrument in both primary and secondary schools and even in the industries and other businesses where the bell timer plays a critical role in running the day (Wikipedia 2011). Bells are also associated with clocks indicating the hour by ringing. Clock towers or bell towers can be heard over long distances which was especially important in the time when clocks were too expensive for widespread use. The bell shape is usually an open-ended hollow drum which resonates upon being struck. Bells were known in China before 2000 BC and in Egypt, India, Greece, Rome, and other ancient cultures. From earliest times, they were used as signaling devices, as ritual objects, and as magical, often protective, amulets (often hung in doorways or around the necks of animals). The use of bells in churches spread through Europe from the 6th to 11th centuries and were first used in Eastern Christian The ringing of a school bell is a signal that tells a school's students when it is time to go to class in the morning or afternoon and when it is time to change classes during the day as well as when students are dismissed from school. Typically the first bell tells the students that it is time to report to class, and the bell that occurs shortly after that means that the students are late. There may also be a warning bell between the first bell and the late bell. In some schools it may take the form of a physical bell, usually electrically operated. In other schools it may be a tone, siren, electronic bell sound, a series of chimes, or music played over an intercom. Most schools where people who require sign language more than hearing go to use hand signals.

II RELATED WORK:

Henry Ohiani Ohize et al. [1] proposed a design of microcontroller- based automatic school bell. In this system they have used a 89c51 microcontroller and a keypad that is used to set the timings, after setting the timing the controller will operate the bell using the relay after the set time interval. No wireless connection of speakers in this system, author uses wired communication between controller and speaker. Syed Naveed Uddin et al. [2] proposed automatic school bell with user defined time schedule, the system is implemented using Arduino based system which has RTC on it, it also has a keypad that is used to set the timings and after the particular time intervals the bell rings which is connected through the relay. It has an Inbuilt Real Time Clock (DS1307 /DS 12C887) which tracks over the real time. The bell ringing time can be programmed at any time, so that it can be used at normal class timings as well as Exam Times.

Aman Tirpude et al. [3] prposed a microcontroller based automatic college bell. The master device is our microcontroller ATmega16 and the slave device is Max232. The Max232 is being interfaced with the microcontroller which is used to convert signals from a TIA-232 (RS-232) serial port from a PC/Laptop to signals suitable for use in TTL-compatible digital logic circuits. The interval of time after which the bell should ring is already programmed and loaded in the microcontroller. If the present time matches the time scheduled in the PC/Laptop, logic high is driven to the output port of microcontroller and the bell rings (6 to 10 seconds). The small voltage (12v) acts as an enable to the relay circuit, which turns on the 230v to the bell and the bell rings.

Abyash Gautam et al. [4] designed and proposed a microcontroller controlled automated college bell. The system demonstrates a simple configuration of a circuit of automatic school\college bell using Microcontroller AT89S52 which is designed so as the bells in the school\colleges are not to be operated manually and are fully automatic and once data is entered the college bell rings after a regular interval as per the programmers need and the timing may be changed in between to include breaks.it also

displays time. In today's world where time is money it can be wasted on Operating manual things and one of the most common would be school/college bell which has to be operated hour after hour and which is also not accurate and requires the use of manpower this can be easily overcome by using a fully automatic system which is operated using a microcontroller where the college bell is operated fully automatic and doesn't requires any manpower and which is much more accurate than the one which is operated manually. It replaces the manual switching of the bell in the college.

Shweta Butoliya et al. [5] presented a microcontroller based automatic college bell with monitoring system The GSM modem communicate with the microcontroller through universal asynchronous trans-receiver pin of IC P89V51RD2, which is used for serial communication. The baud rate used here is 9600. At the initial stage the values of SCON, TMOD and TH1 are set. The microcontroller transmits a set of AT commands to read the message. LED display board accommodates 336 LED's (7*48 LED display) with 7 rows and 48 columns. As we know 1 character is of 8 bit we are using 6 shift register IC's are connected in cascading to shift each character column by column. The

III. PROPOSED SYSTEM

In this paper we have designed an embedded system that can control the college bell wirelessly from PC and the system can also play our national anthem on daily.

Block Diagram of System and Description:-

A) Transmitter block diagram:

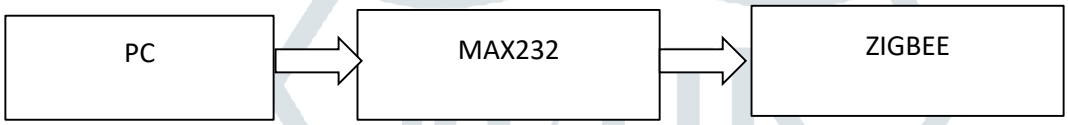

Fig 1: Transmitter block diagram

Controller is supplied with the standard character set containing alphabets, symbols, numbers and special characters through programming. For each such character display pattern in the form of HEX value is stored inside the. Microcontroller which is termed as look up table. After check for the pattern the microcontroller send out the data bits serially with clock signal. This data is shifted by the shift registers. The data is sent on columns and rows are scanned fast which make us feel that the pattern to be displayed is in continuation and this happens because of persistence of vision. The microcontroller only keeps the message part and discards the remaining message.

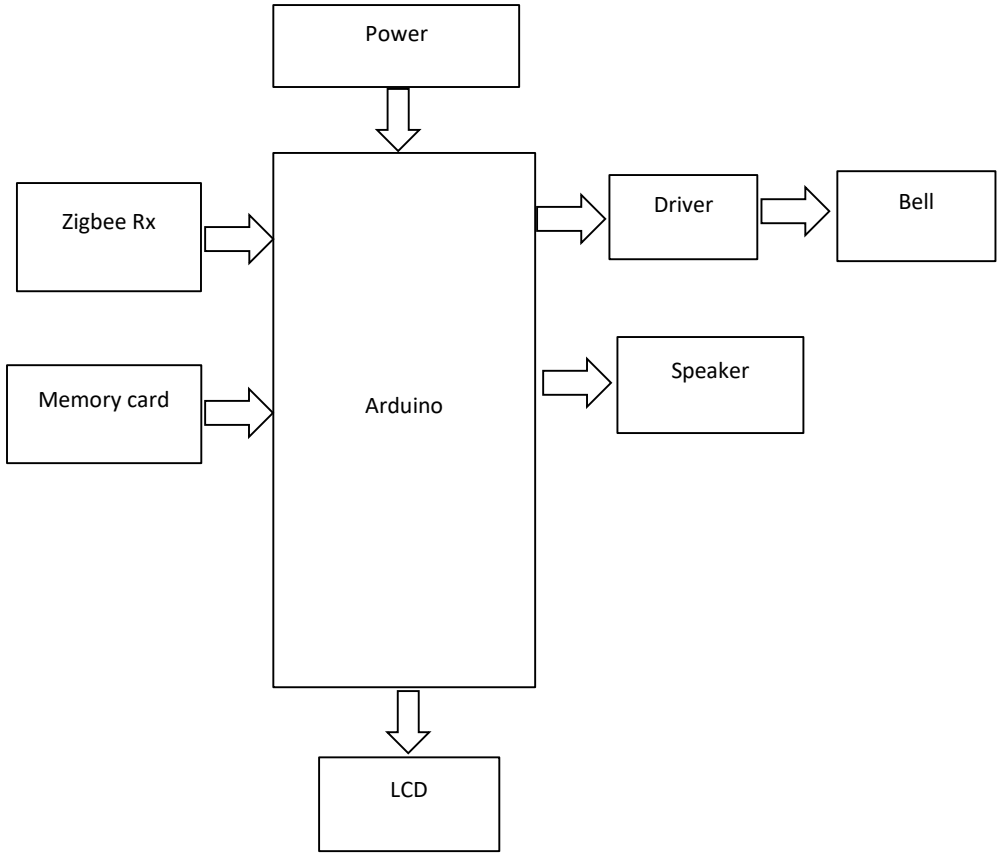

Fig 2: Receiver block diagram

Arduino Uno

It is a microcontroller board based on the ATmega328P (datasheet). 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. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again."Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

SD Card Module :-

The module (Micro-SD Card Adapter) is a Micro SD card reader module, and the SPI interface via the file system driver, microcontroller system to complete the Micro-SD card read and write files. Arduino users can directly use the Arduino IDE comes with an SD card to complete the library card initialization and read-write.

Relay :-

Relays are most commonly used switching device in electronics. Let us learn how to use one in our circuits based on the requirement of our project. Before we proceed with the circuit to drive the relay we have to consider two important parameter of the relay. Once is the Trigger Voltage, this is the voltage required to turn on the relay that is to change the contact from Common->NC to Common->NO. Our relay here has 5V trigger voltage, but you can also find relays of values 3V, 6V and even 12V so select one based on the available voltage in your project. The other parameter is your Load Voltage & Current, this is the amount of voltage or current that the NC,NO or Common terminal of the relay could withstand, in our case for DC it is maximum of 30V and 10A. Make sure the load you are using falls into this range

LCD: LCD is utilized as a part of a venture to imagine the yield of the application. We have utilized 16x2 LCD which demonstrates 16 segments and 2 lines. Thus, we can compose 16 characters in every line. In this way, add up to 32 characters we can show on 16x2 LCD. LCD can likewise use in a venture to check the yield of various modules interfaced with the microcontroller. Along these lines LCD assumes an essential part in a venture to see the yield and to investigate the framework module shrewd if there should be an occurrence of framework disappointment keeping in mind the end goal to amend the issue.

Zigbee :-We now carry the Series 2 zigbee "ZigBee" modules. This is the series 2 ZigBee protocol 1mW with wire antenna. Its good for point-to-point, multipoint and mesh networks. This module is a little more difficult to get going than the Series 1 - you must set up a "coordinator" module so they are not as plug-and-play. We suggest this module for those who are following the Building Wireless Sensor Network book
Series 2 modules cannot talk to Series 1 modules so if you already have some S1 type zigbee you may want to stick with them. The S2 modules are not necessarily 'better' than S1 for many projects. They're just different as they use the "Zigbee"

Algorithm:-

A. Transmitter

Step1 start
Step2 initialize the transmitter zigbee
Step3 check for the input at the GUI
Step4 the input present go to step3 else go to step5
Step5 generate command and transmitter it to zigbee receiver via the zigbee transmitter
Step6 go to step3

IV. SOFTWARE (FLOWCHART)

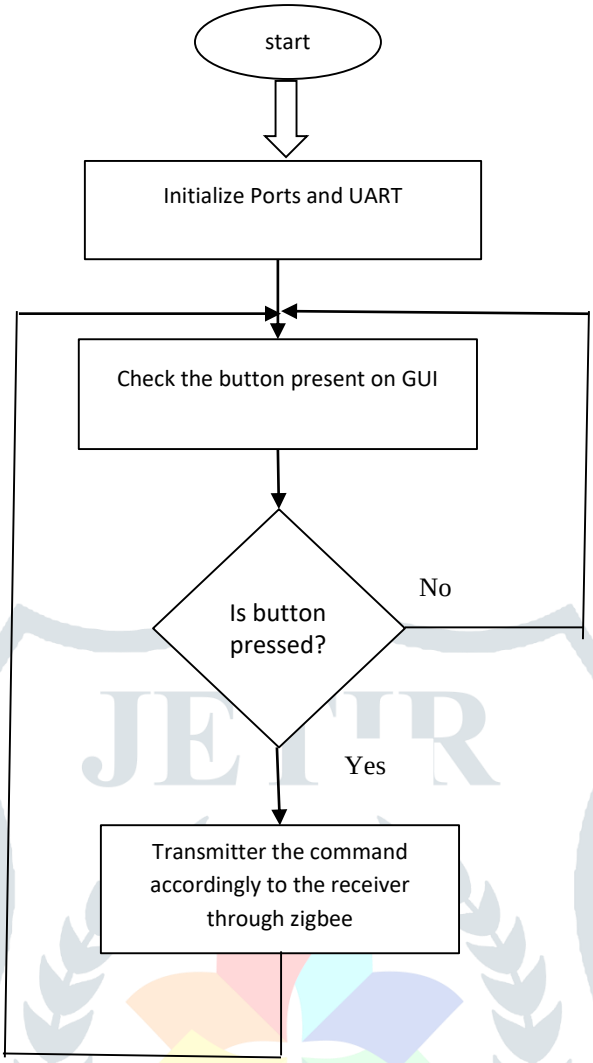

Fig. 3: Flow chart of transmitter

B. Receiver

Step1 start
Step2 initialize all the input and output port
Step3 display the title on the LCD
Step4 check for signal from zigbee
Step5 if signal not received go to step4
Step6 compare the received and command in Arduino
Step7 perform the particular function according to the command
Step8 go to step4

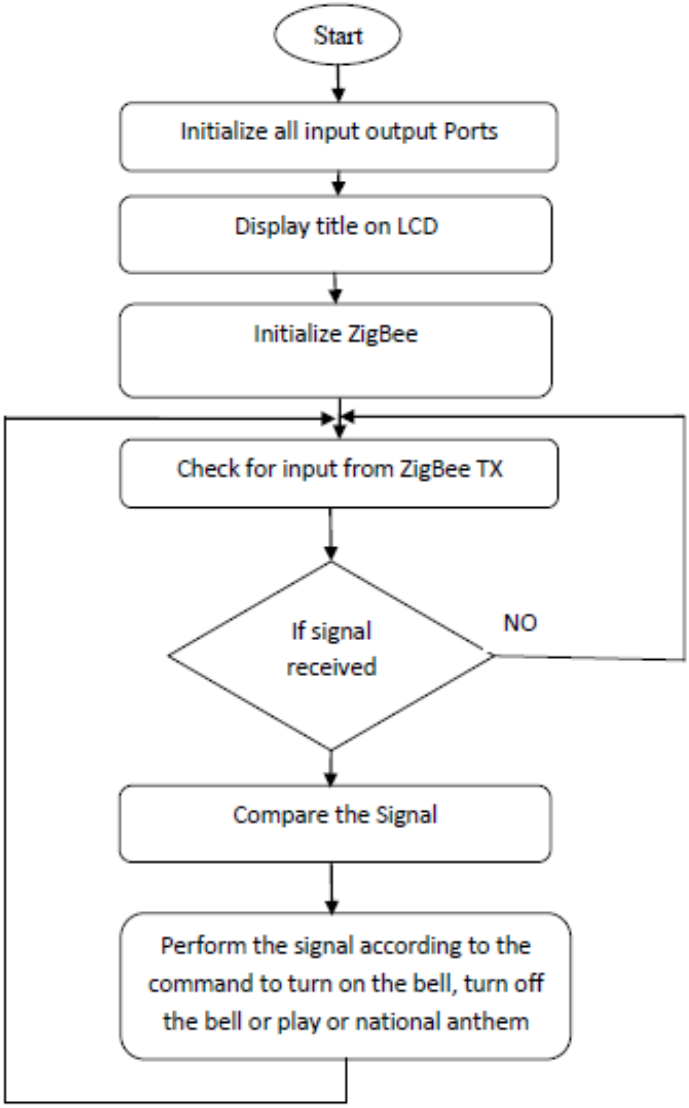

Fig 4:- Flowchart of receiver

V. Conclusion:

We implemented programmable wireless bell system for collages and school using zigbee. The programming of timing can be done by software on the computer. That transmitter side consist of a zigbee module connected to PC and a software that is used to control the bell command are sent through the zigbee. The zigbee model sends the signal wirelessly to the zigbee present at the receiver. At the receiver signal received processed by the Arduino controller. As per the received signal from transmitter, controller at the receiver take the action and according it controls bell. The main benefit of our system is it is wireless and hence receiver position can be changed anywhere in the prescribed region. The future work is to increase the distance between the transmitter and receiver.

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