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ELECTRONIC CIRCULAR BOARD USING GSM TECHNOLOGY

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Abstract: - In the last couple of decades, communication technology has developed by leaps and bounds. The use of “Embedded System In Communication” has given rise to many interesting applications. One of such applications is Public Addressing System (PAS).The existing systems are generally hardwired, complex in nature and difficult to expand the over reliance of this practice in the world is not enough to pass relevant information around as many problems are encountered. In this proposed system, the idea of adding wireless communication interface such as GSM to these systems to overcome the above limitations. In short, the GSM module which is located at the digital notice board receives the message from the authorized user and displayed on the notice board which is situated at remote location. For authentication purpose, one can create an Android application which is useful for viewing earlier messages in PC through internet. Mean user can able to send the messages from anywhere and these messages are displayed on the LED display.

Keywords: SMS Gateway Provider, SIM900 GSM Modem, AT89S52 (Microcontroller), LED display.

INTRODUCTION:

A Notice Board is common information sharing medium in any institution or any public places like bus stations, railway stations, and amusement parks. But putting on various notices day in and day out is time consuming. Additional man power is required to take care of this notice board. This paper deals with an electronic circular board.

GSM a digital mobile telephony system, which is globally accessed by more than 212 countries territories. Global system for mobile communication is completely optimized for full duplex voice telephony. Initially developed for the replacement of first generation (1G) technology, now GSM is available with lots of salient features with constant up gradation of 4G technology. People are now adapted to the idea of the world at the finger tips. The use of mobile phones has increased drastically over years. Due to this international roaming capability of GSM, we can send messages to the receiver to any part of the world.

EXISTING SYSTEM:

It presents an SMS based notice board incorporating widely used GSM to facilitate the communication of displaying messages on notice board via user mobile phone. The message to be displayed is sent through the SMS from an

authorized transmitter. The microcontroller receives the SMS validates the sending mobile identification number (MIN) and displays the desired information. The displayed board programs itself with the help of incoming SMS with proper validation. Here in advertising display system mobile is used as a transmitter which transmits SMS and from GSM Modem to LED display which is used as a receiver.

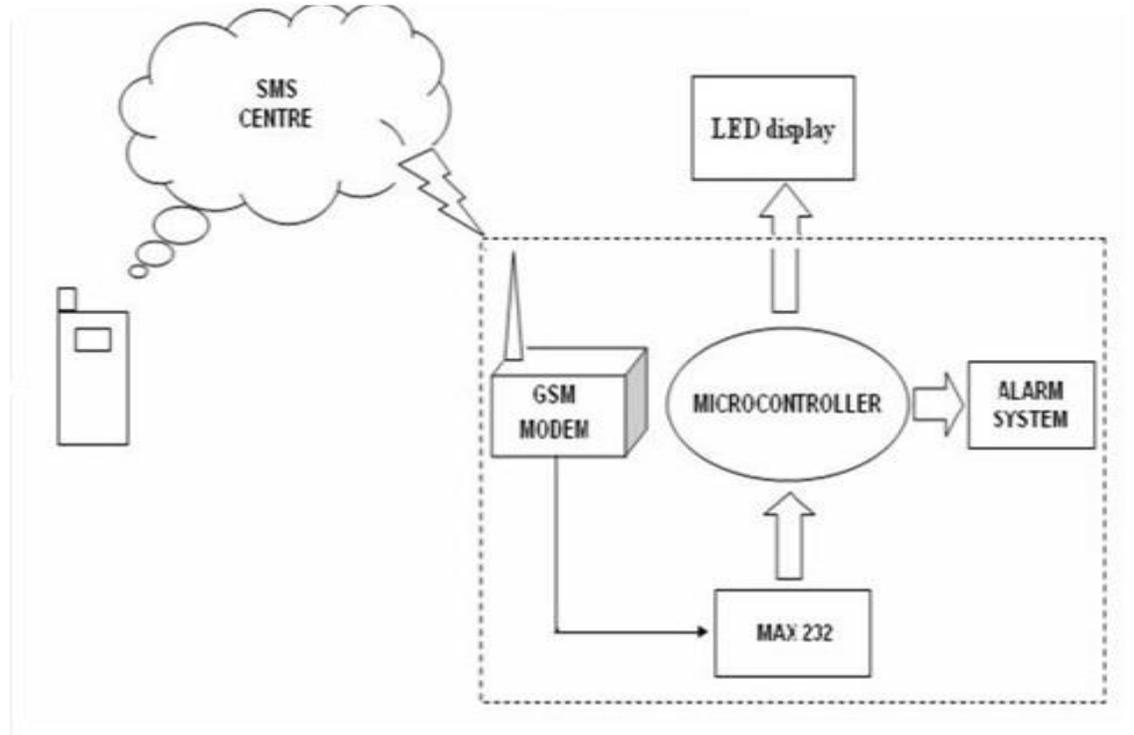


Fig 1: Architecture of SMS based display

RELATED WORK:

Masood Khan, Pratik Bhosale, Sandesh Dalvi has presented the methodology of sending messages through mobile phone and it is displayed on the LCD display. At the same time this message will be sent to different users mobile numbers that are stored in the microcontroller memory. So spreading of important message or notice will be takes place within a span of time to respective mobile numbers.

LITERATURE SURVEY:

The word GSM stands for Global System for Mobile Communications. Nowadays interest regarding GSM related concepts is increasing. So, we have surveyed a list of various GSM based projects ideas which are having more demand and very interesting to learn. The projects based on GSM technology we surveyed gave us better idea about the GSM technology.

GSM based Data Acquisition system:

This is a process control system that enables the operator to regulate and monitor that are spread along various places [1]. This project monitors various parameters like light intensity, humidity, wind direction, temperature, rainfall, etc., This system eliminating the need for man power to visit each site for inspection and data collection thus saving money and time. All types of industries are using these systems for example food processing, electrical distribution and security alarms.

SMS based teaching and learning system:

SMS technology is one the most stable technologies around the world [2]. Most of the students carry mobile phones with SMS facilities that can be used for teaching and learning. This project lets the student know about the topic studied earlier s it gives a review on the topic as well notifies them about the further topics to be studied. This project system is capable of supporting administrative teaching and learning activities through the help of SMS technology.

Multiple units GSM controlled devices:

The human brain always is in search of information of interest to control systems of its choice [3]. In this modern-age of electronic systems it is very important to be able to manage and acquire as much as information from all places. Remote management of several office appliance and machineries and also homes is a subject of growing interest and in recent times we have seen many such systems giving out such controls. In this system we have developed an interface which is a phone based home-office remote controller equipped with power to turn ON/OFF the appliances and receive status of electrical appliances placed at various positions. So, studying the above project concepts we came to an understanding that GSM network is widely used today whether it is for calling or SMS or the above discussed topics. Also some places need urgent notices like in school-college, railway stations, Airports, stock-market and this notice should be in real-time, so we need a real-time notice board.

This project is our experiment to give a start to the era of real-time noticing. This project is about writing the message which is to be displayed in mobile and send it as SMS to other side and we can also use our MATLAB based GUI to send the same message. Also by interfacing a voice data recording IC with Microcontroller we can also do announcements in real-time.

PROBLEM STATEMENT:**a) Keeping tabs on sent messages**

As messages sent to any mobile are done on a forward and forget basis, there is no way to determine whether sent SMS is relevant i.e. has it reached student when it matters most.

b) Keeping records of received messages

On student front, information will be lost if the message is deleted from inbox hence undermining the importance.

c) Faculty Interaction

Faculty interaction with HOD is not covered as they have to pay for the SMS sent by them.

SOLUTION:

More than 90% of faculties in my institution own an Android based Smart phone, hence we are introducing an Android application for circulating and storing the messages. It helps to view the earlier messages in any remote location.

Resident application on user smart phone will receive SMS and incorporate the information into its coding thus securing information. Also it will check the time stamp of the send message and determine validity of message and take action accordingly.

For higher authority, Application resident on HOD's Smart phone will send real time updates to server, where it will be the job of the server to process it, analyze it and send it to the appropriate group of teachers.

The system includes microcontroller and level shifter to display the messages or circulars on the LED display.

PROPOSED SYSTEM:

This will be a moving message display, which can be used as the digital notice board, and also a GSM modem, which is the latest technology used for communication between the mobile and the embedded devices. System will work like when the user wants to display or update the notice board, the user has to send the message from his mobile defining the message and then the password of the system to the number of the SIM which is inserted in the display system MODEM.

Then the MODEM connected to the display system will receive the SMS, the microcontroller inside the system is programmed in such a way that when the modem receives any message the microcontroller will read the message form serial port and verify for the password, if the pass word is correct then it will start displaying the messages in the display system. The messages are displayed on the LED display. The prototype of the GSM based display toolkit has facilities to be integrated with a display board thus making it truly mobile. The toolkit accepts the SMS, stores it, validates it and then displays it in the led module. The SMS is deleted from the SIM each time it is read, thus making room for the next SMS. The major constraints incorporated are the use of „*“ as the termination character of the SMS and the display of one SMS as a time. The limitations can be removed by the use of higher end microcontrollers and extended RAM. The prototype can be implemented using commercial display boards.

The use of “Embedded System in Communication” has given rise to many interesting applications that ensures comfort and safety to human life. GSM technology is one of the new technologies in the embedded field to make the communication between microcontroller and mobile. Now every embedded system is used to communicate with other system using GSM and GPRS technology, In this system the MODEM is used to access the message sent by the user to display on notice board. This system has many important applications and can be used to update the remote notice board from far off places using GSM MODEM by sending SMS between the mobile and the embedded devices (microcontroller 89s52). This remote control of notice board is possible through embedded system. The microcontroller is interfaced with GSM Modem in mobile phone via MAX232 level convertor. The microcontroller system is designed to allow easy use of a mobile phone to update the notice board at any far location. Using a mobile phone the development of the notice board is being carried out using SMS, this will update the notice board with the help of the microcontroller modules attached to it, which provides the moving message displayed on the LED using 89s52.

By using Android application we are sending messages which are stored in PC and then it will be received by the GSM Modem (SIM 900). These are interfaced with the microcontroller; finally message will be displayed on the LED display.

THEORITICAL FRAMEWORK:

1. GSM Modem:

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. Generally, computers use AT commands to control modems. Reading of message from the SIM card inserted into the modem is done by sending the appropriate AT command to the modem. In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. [6]Some common basic SMS related AT Commands are shown in table below:

AT Command	Meaning
+CMGS	SEND MESSAGE
+CMSS	SEND MESSAGE FROM STORAGE
+CMGW	WRITE MESSAGE TO MEMORY
+CMGD	DELETE MESSAGE
+CMGC	SEND COMMAND
+CMSS	MORE MESSAGES TO SEND

2. RS232 converter (MAX 232N):

Vital role of RS232 converter (Max 232n) in „GSM based LED display“. RS232converter is a chip to convert the TTL voltage levels into RS232 level and vice versa. In this system GSM modem is communicated with the microcontroller using RS232serial data format. In order to make MODEM serial port compatible with microcontroller serial port the RS232 converter is used.

3. LED Display:

Microcontroller based scrolling message display have the following features:

1. The message to be displayed is stored in memory and the message length to be displayed is limited only by free memory space of the microcontroller.
2. The number of character displayed at a time can be high as 30.

4. Buzzer:

Buzzer is controlled by the microcontroller using single pin. Sometimes it can be interchanged according to the transistor used to drive the device. The buzzer subsystem produces a 2 KHz audible tone when powered. The buzzer will sound when the signal coming into the driver is high. It must be connected to a Darlington transistor or transducer driver subsystem .The buzzer is connected between the supply rail (+ V) and the input signal.[7] This acts as load on the driver. When the input signal coming into the buzzer subsystem is low, a potential difference across the buzzer causes current to flow. It is this flow of current that causes the buzzer to sound. Buzzer is connected to microcontroller port pin, so microcontroller will give high or low to switch on/off buzzer. In this system it is used to define the arrival of the SMS in the form of sound.

5. GSM MODEM-PC Interfacing:

GSM Modem is used to receive message from the

Authorized user. This GSM modem requires a SIM card from a wireless carrier in order to operate. This SIM number is contact number of the receiving section. PCs use AT commands to control modems. Although GSM modem is interfaced with PC through Bluetooth using a VB program, a GSM modem can be tested before actually implementing into the system. The MS HyperTerminal is a handy tool when it comes to testing the GSM device. It can be found at *Start -> Programs -> Accessories > Communications -> HyperTerminal*. Various parameters like connection name, icon, comm. port, and correct port settings are specified for our GSM modem. Finally in the hyper terminal main window

AT commands are sent and responds received from GSM modem can be seen. Screenshot of dialog box showing sending and receiving of AT commands is shown in figure below (Here mobile phone connection is the connection name).

We will first have to type "AT" A response "OK" should be returned from the mobile phone or GSM modem. Now we will type "AT+CPIN?". The AT command "AT+CPIN?" is used to query whether the mobile phone or GSM modem is waiting for a PIN (personal identification number, i.e. password). If the response is "+CPIN: READY", it means the SIM card is ready for use. After this, various AT commands depending on the used modem's instruction set are sent to modem and responses are received. This process is very useful in testing GSM modems.

SOFTWARE REQUIRED:

1. **Express PCB**-Express PCB is free PCB software and is a snap to learn and use. Designing circuit boards is simple for the beginner and efficient for the professional. The board manufacturing service makes top quality two and four layer PCBs.
2. **Embedded C**-Embedded C is used for microcontroller programming. There is a large and growing – international demand for programmers with 'embedded' skills, and many desktop developers are starting to move into this important area. Because most embedded projects have severe cost constraints, they tend to use low-cost processors like the 8051 family of devices considered in this paper.
3. **Keil**-Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. The Keil 8051 Development Tools are designed to solve the complex problems facing embedded software developers.

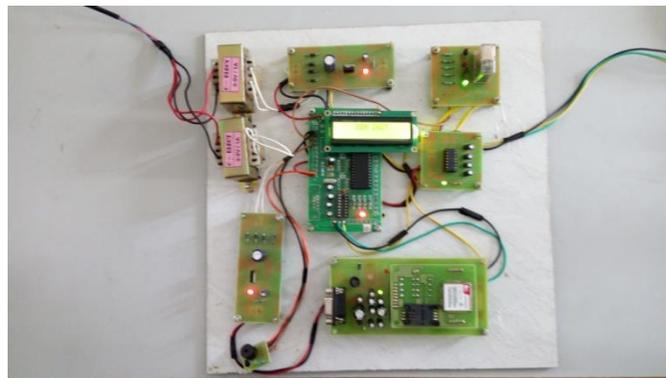


Fig 2: Electronic Circular Board kit



Fig 3 Electronic Circular Board output display
(1.time, 2.date, 3.text message)

APPLICATIONS:

Colleges: For displaying important messages .eg: placement news, cultural activities news, etc.

Hotels: To display the availability of the rooms and the room rents , the type of rooms.

Restaurants: To display the menu and offers etc.

Railway stations: To display the scheduling time of the train and the platform, the services offered by the Railways.

Nursing homes: To display the staff attendance, the availability of the doctors, the list of the specialized Doctors, no of in patients etc.

FUTURE ENHANCEMENT:

A commercial model can be able to display more than one message at a time. In our system we are sending messages via GSM network and displaying on a LED by utilizing AT commands. The same principle can be applied to control electrical appliances at a distant location. Robots can be controlled in a similar fashion by sending the commands to the robots. This can be used for spy robots at distant locations, utilized by the military to monitor movement of enemy troops.

CONCLUSION:

By introducing the concept of wireless technology in the field of communication we can make our communication more efficient and faster, with greater efficiency we can display the messages and with less errors and maintenance. This model can be used very efficiently in establishments like chain restaurants wherein the order and special discounts can be displayed at all branches simultaneously, in colleges wherein students and staffs can be informed simultaneously in no time. It can be set up at public transport places like railways, bus station, and airport and also at roadside for traffic control and in emergency situations, it is cost efficient system and very easy to handle. Latency involved in using of papers in displaying of notices is avoided and the information can be updated by the authorized persons.

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