

“Smart e-Advertisement for the Applications of Shopping Complex Using the Concept of IoT”

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Abstract— As we know in present era Shopping Complex requires the advertisement which is based on the technology of Internet of things. In current stage every shopping malls are require a fast notice system which is based on cloud. In previous design there is lots of systems are there which is based on this application but mostly are using GSM technology which is only SMS based. In this work we will design a system which is based on completely server based technology here where we do any change on website so automatically that particular message will send to advertisement screen similar. Here for shop owner we design one web page like that when shop owner write any regular customer’s mobile number, then advertise send to on that number. So loyal customers will get the any offer by SMS. This same feature is very useful for schools. This is an automated system that utilizes GPRS technology along with an embedded server. The system is designed to work independently without the need of any human operator. The system has the capability to store previous notifications which have been sent and is designed to work 24/7.

In this work we are using ARM7 LPC2148 microcontroller & SIM900A GPRS technology. Here we will design complete system which is based on Proteus & we will interface real time hardware unit like SIM900A. In this project we will also design a cloud server which is based on one web site this server is design by using PHP.

Index Terms—Embedded system, ARM Processor, GSM Module, LCD Display, KEIL, PROTEUS.

I. INTRODUCTION

Internet of Things (IoT) term represents a general concept for the ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes.

Nowadays IoT is everywhere in the world to make the smarter world. Due to IoT we can see many smart devices around us. Many people, including myself, hold the view that cities and the world itself will be overlaid with sensing and actuation, many embedded in “things” creating what is

referred to as a smart world. For example, today many buildings already have sensors for attempting to save energy, home automation; cars, taxis, and traffic lights have devices to try and improve safety and transportation; people have smart phones with sensors for running many useful apps; industrial plants are connecting to the Internet; and healthcare services are relying on increased home sensing to support remote medicine and wellness.

The project aims in designing a notification system, which is capable of automatically sending information about results, circulars, schedules and time tables to the students or shopping centre will send about discounts or new arrivals to their customers. Using single click on web they can able to send promotional offers to their loyal customers. This project will be to design a GSM based electronic notice display system which can replace the currently used programmable electronic display. We can display any important information through web server on Notice board. And also we can send this advertisement to customers by entering their numbers.

II. PREVIOUS WORK

According to Azam Rafique Memon, Bhawani Shankar Chowdhry, Syed. M. Shehram Shah, Tarique Rafique Memon and M. Z. Abbas Shah are using little bit different approach for making Electronic Information Desk System. Here they are using SMS based approach but different way. The system is designed to work independently without the need of any human operator and when a student or employee needs any information, they will need to send an SMS to this system which will respond with the information required by user.

John A. Stankovic vision saying Many technical communities are vigorously pursuing research topics that contribute to the IoT. Today, as sensing, communication, and control become ever more sophisticated and ubiquitous, there is significant overlap in these communities, sometimes from slightly different perspectives. More cooperation between

communities is encouraged. To provide a basis for discussing open research problems in IoT, a vision for how IoT could change the world in the distant future. [3]

According to Akogbe, Digital electronic display board is fast gaining acceptance and application in different spheres of life which include educational institutions, public utility places and in advertisement due to the problem associated with construction of signposts and manually placement of papers on walls, buildings, and edifices which makes the environment look untidy. These authors present the design and development of a microcontroller based electronic scrolling message display board, which will be used to display messages and information in real-time via SMS. [6]

N. Jagan Mohan Reddy, G.Venkareshwarlu, deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board which is synchronized using the GSM technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of pasting the message on notice board. This proposed technology can be used in many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers. Using various AT commands is used to display the message onto the display board. GSM technology is used to control the display board and for conveying the information through a message sent from authenticated user [7].

According to Jayavardhana, the term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has been more inclusive covering wide range of applications like healthcare, utilities, transport, etc. Although the definition of 'Things' has changed as technology evolved, the main goal of making a computer sense information without the aid of human intervention remains the same. A radical evolution of the current Internet into a Network of interconnected objects that not only harvests information from the environment (sensing) and interacts with the physical world (actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analytics, applications, and communications. [4]

III. PROPOSED METHODOLOGY

In this work we will design an E-Notice board system which is based on GPRS connection. Here we are using Proteus 8.0 as Virtual software, using of this software we will create a virtual hardware environment. In this approach basically we are targeting the Shopping mall which is always crowded space on holidays. Using this system we can update any advertisement or information by one website which is automatically flash on the Advertisement screen. And also maintain the humidity inside the shopping mall when it is crowded. In Fig.1 block diagram of proposed system is there.

Hardware Components:

- SIM card Holder
- GSM module (SIMCOM 900A)

Virtual Components:

- Microcontroller (ARM7)
- Notice Board (40 X 2 LCD display)
- MAX 232
- Crystal oscillator (11.0592 MHz)
- Capacitors and Resistors
- Power adapter (+5v)

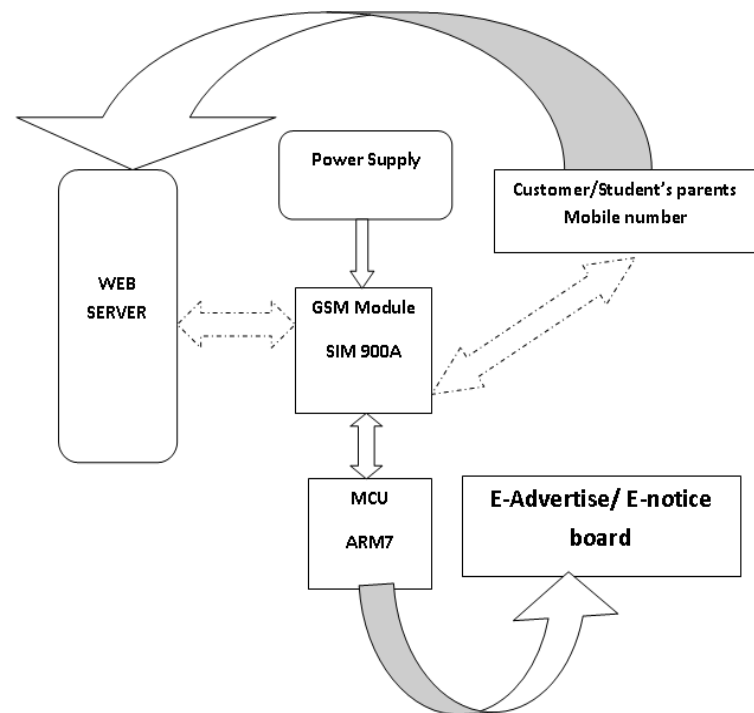


Fig.1: Block diagram of proposed system

A. How to Interface GSM Module with PC

To interface GSM Module with our system you need RS232 to USB cable. In below figure you can see this cable.

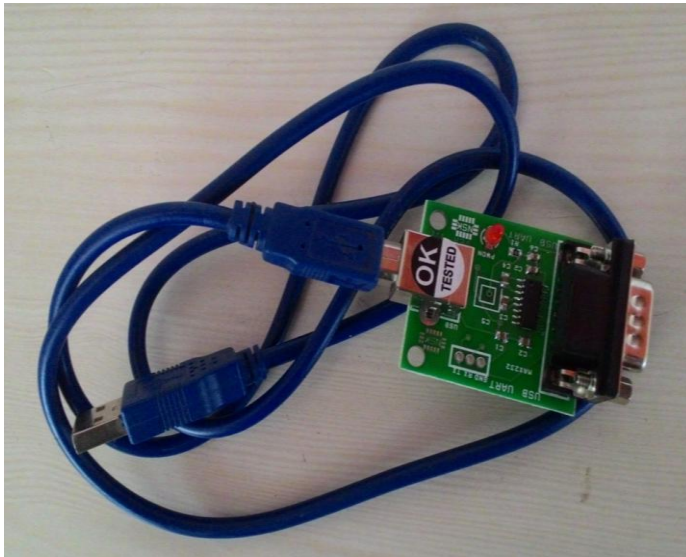


Fig.2: RS232 (Male) to USB Cable

After connecting this cable you have to check COM Port is generated or not in your system. The interfacing of the GSM/GPRS module with the serial port of the computer involves following steps:

- 1) Connect RS-232 port of GSM module with the serial port of the computer. Insert a SIM card in the module.
- 2) Download Putty software and Open it.
- 3) Select serial option and mention COM port at which GSM module is connected and Baud rate.

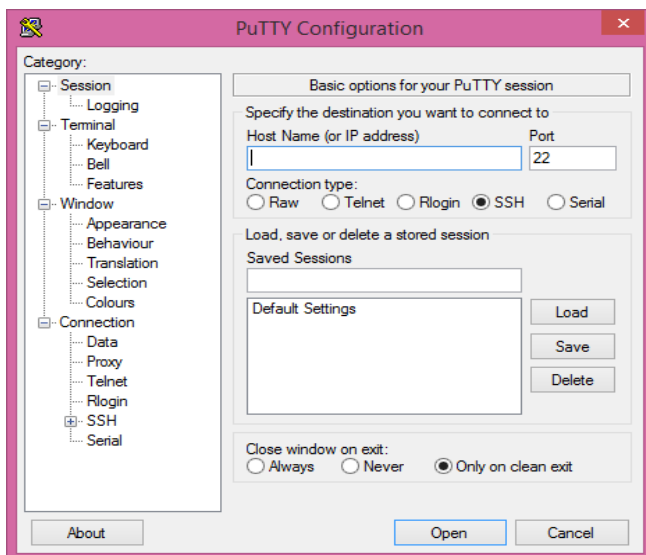


Fig.3: Putty Start Window

Using this approach, we can see response of AT commands in putty software (Fig.4).

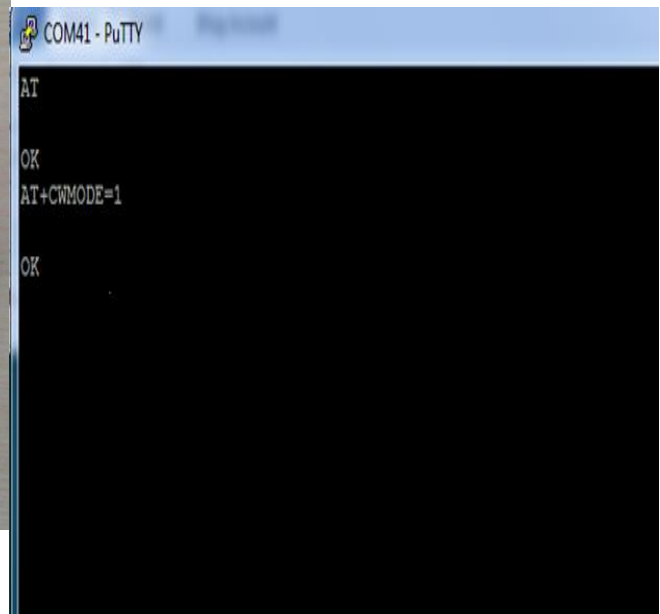


Fig. 4: Putty COM port window for AT command

B. Interface of GSM Module with Microcontroller

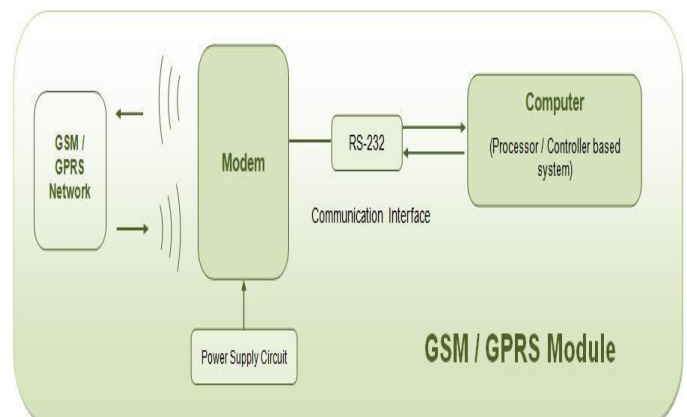


Fig: 5: Interface between GSM and Micro-controller

Fig.5 shows how to interface the GSM with microcontroller. The GSM module is communicate the microcontroller with mobile phones through UART. To communicate over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground). GSM modem interfacing with microcontroller for SMS control of industrial equipments. The sending SMS through GSM modem when interfaced with microcontroller or PC is much simpler as compared with sending SMS through UART. Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e., TxD, RxD and GND.

In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other. The transmit signal of serial port of microcontroller is connected with

transmit signal (TxD) of the serial interface of GSM Modem while receive signal of microcontroller serial port is connected with receive signal (RxD) of serial interface of GSM Modem.

Display a text in mobile from LPC2148 Primer Board by using GSM module through UART. In LPC2148 Primer Board contains two serial interfaces that are UART0 & UART1. Here we are using UART0. The GSM modem is being interfaced with the microcontroller LPC2148 Primer Board for SMS communication. The SMS can be sending and receiving for the data sharing and situation information and control.

Pin Assignment with LPC2148

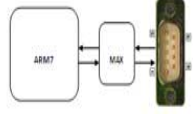
UART Connector	DB-9	LPC2148 Processor Lines	Serial Port Section
UART0(P1) ISP PGM	TXD-0	P0.0	
	RXD-0	P0.1	
UART1 (P2)	TXD-1	P0.8	
	RXD-1	P0.9	

Fig. 6

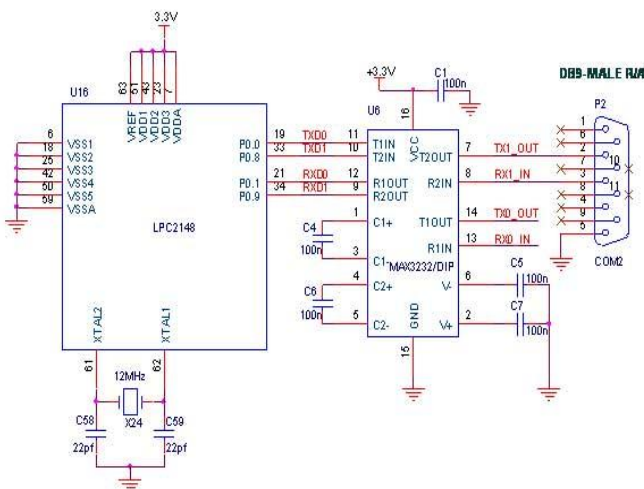


Fig.7: Schematic of interfacing LPC 2148 with COM Port using MAX232

C. Implementation of e-advertisement system in Proteus 8

In this approach we are using virtual hardware using Proteus 8. So we have to make virtual connection using Virtual Serial Ports Emulator (VSPE) software.

How to make virtual connection in Proteus?

Install VSPE software and open it. After opening software, select Device > Create. Then select Device type > Splitter > Next. Now select virtual serial port and Data source serial port and also in settings set the Baud rate 9600. Then click on Finish.

By performing these steps, we can create virtual connection between GSM module and Proteus virtual terminal. You can see in below screen shot.

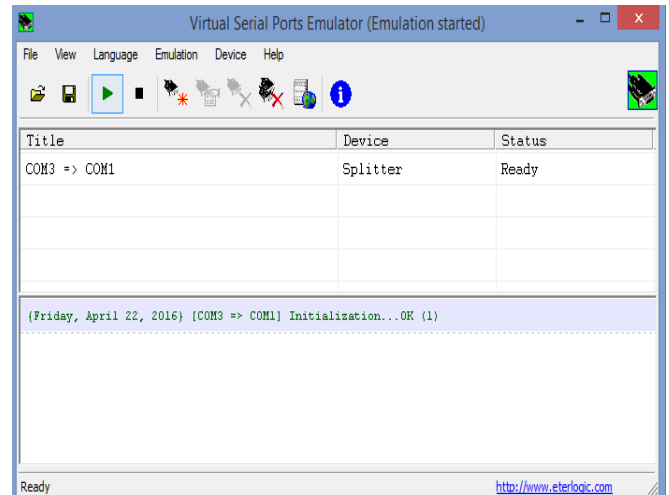


Fig.8

Now virtual environment is ready for the GSM module. To debug the project in proteus we need hex file. So we are going to generate hex file in Keil software.

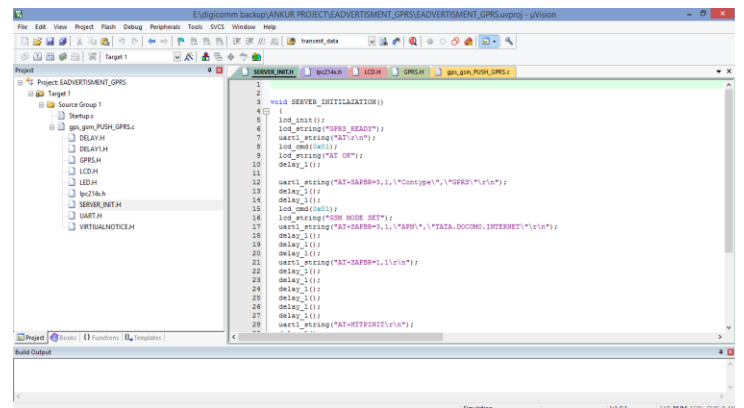


Fig.9

(a) Source code window of Keil

Go to Flash > Configuration Flash file...

After selecting Configuration flash file, it will open Target window. Here you select Output option and select the Create HEX file option...

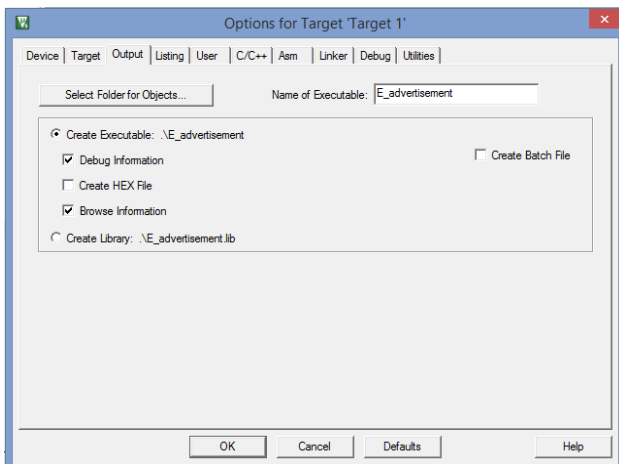


Fig.10

Now give the name of HEX file and click on OK.

A hex file will create by compiling the program. So you can see below how to build program in Keil. Click on Build symbol.

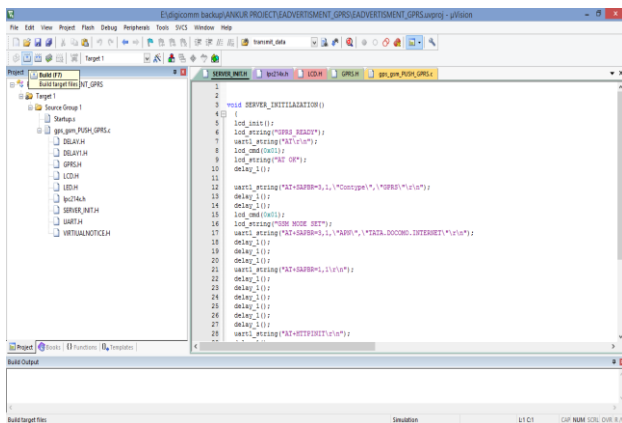


Fig.11

So after Building the program you can see hex file is successfully created.

Now we will use this hex file to run the simulation in Proteus 8. Next final step we have to insert hex file in controller. Just double click on controller component; it will open below given window.

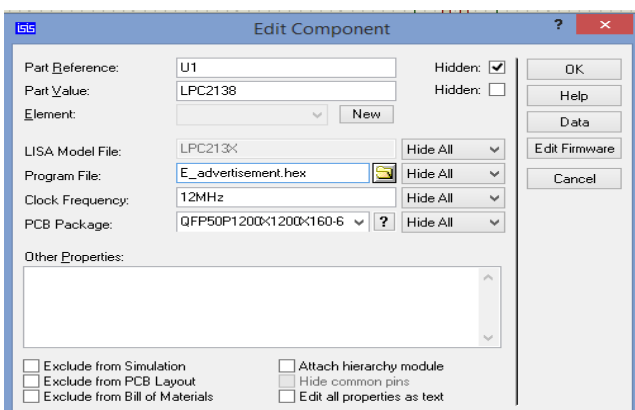


Fig.12

Here you have to give hex file in Program file option. Then click on Ok. Finally to check the output, select Debug > Run Simulation in Proteus 8.

After this we have to implement schematic design in Proteus. Already we learn about proteus how to import components in schematic capture. In below figure you can see implementation of e-advertisement system.

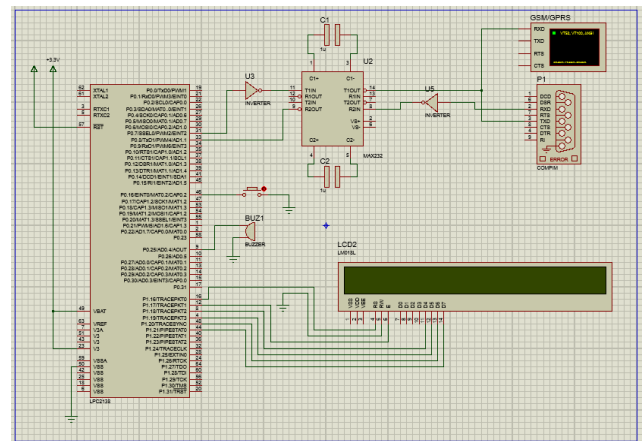


Fig.13

After this we have designed two web pages in HTML. For changing the advertisement we design one the http link: <http://vandanashop.netiu.net/ADVERTIZMENT.html>

So using this link user can modify the notice or important message on LCD display. In below figure you can see how it will work.

After going on this link, user have to write any message whatever he wants to display on notice board display. Then click on POST ADD button. So message will be display on advertisement Board.

One good feature is implemented in this project. Like SOS button. This feature is very useful for shopping malls and schools. If some emergency will come in mall or schools, by pressing single button owner or principal will get emergency message. So they can take any action against emergency. Or shopping mall owner wants to send some promotional offer to his loyal customers; he can use another link for sending message. This feature is very useful for the school or colleges.

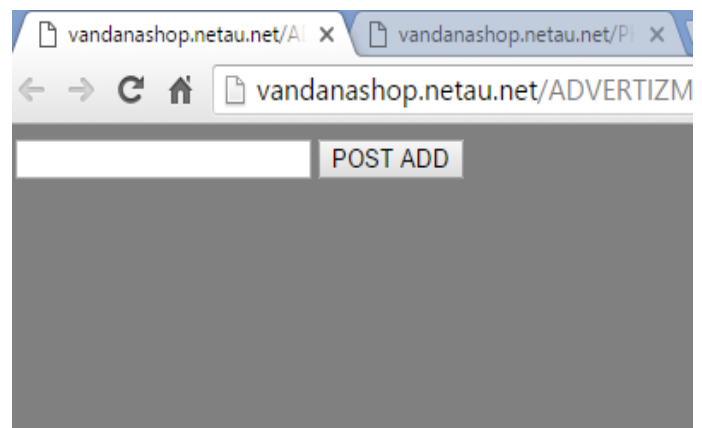


Fig.14

First go through below given link:

<http://vandanashop.netiu.net/PHONE.html>

Now School principal can able to send any parents by writing one mobile number.

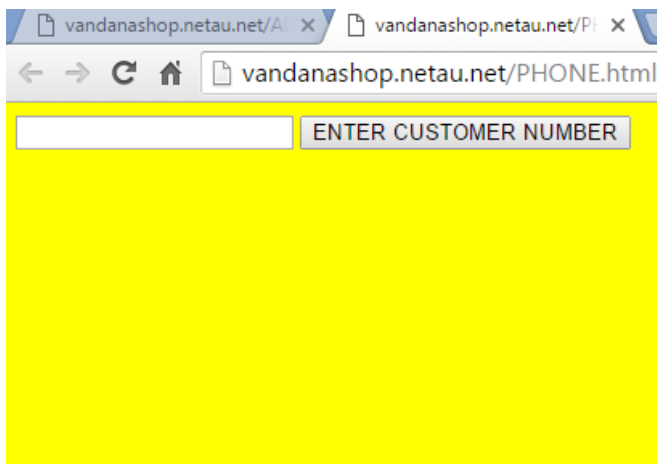


Fig.15

IV. RESULT

Here we implemented virtually e-advertisement system in Proteus 8. We inserted final .hex file in compiler of Proteus. So we can easily analyze the result of implemented system.

Result: 1

When we will modify the message on website and click on POST ADD button, Advertisement automatically change on LCD Display.

This feature is useful for big showroom and schools. Anytime and from anywhere they can able to modify or change the advertisement or important notice vice versa.

Result: 2

Another way is also implemented to change the advertisement on LCD Display. If user wants to change the advertisement, so he can send message in specific format. So by sending message also user can able to change advertisement on LCD display.

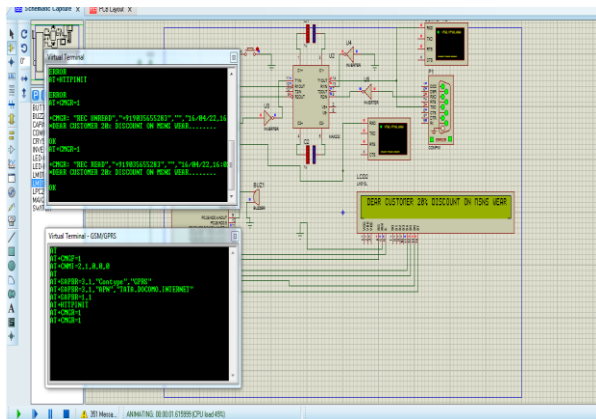


Fig.16

This feature is most important for shops owner in Big shopping mall. They can advertise own product discount or sale by sending SMS only. No need of any internet connection.

Result: 3

One of the best feature we implemented with this e-advertisement system. The feature name is SOS. When any critical situation comes in mall or emergency comes in schools, by pressing SOS button they can send emergency message to owner or principal for the Help.

This feature is not limited to emergency situation. But Shop owner can send promotional offer or any good offer to his loyal customers. Just owner has to write customer's mobile number and click on Button. So SMS or advertise will go on customer mobile number.

We have done some result analysis by comparing previous year papers.

RESULT ANALYSIS

Features	Base Paper 1	Base Paper 2	Own Paper
SMS Based Notice Board	Yes	Yes	Yes
Web Based Notice Board	No	No	Yes
SOS feature (Send SMS to Customers about advertise)	No	No	Yes

Table-1

V. REFERENCE

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