Identity based Localization Technique in Microcontroller using GSM

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Abstract— One of the important features of Communication System is to find the Location of a Person. This paper deals with advanced notice board. Notice board is primary thing in any institution or organization. The GSM is used to facilitate the communication of displaying message on notice board via user’s mobile phone. The user name and mobile phone is thus fetched into the microcontroller. One user can use the Location Tracking Application. The name is displayed on the LCD (20X4) Matrix Display Array. The notice board mainly focuses on transmission of data through air interface by the use of GSM through serial communication. The data will be processed by the microcontroller on both ends. GSM technology is used to control the display board and for conveying the information. The microcontroller that further displays it on notice board which is equipped with a LCD display interfaced to a microcontroller from PIC family duly powered by a mains supply. In this paper discuss the implementation of a simple and cost effective system that assists users in tracking person within a campus environment.

Key words: Location Identification, GSM, Notice Board

I. INTRODUCTION

Now-a-days advertisement is going digital. Control and communication has become important in all the parts of the world. This gave us the idea to use mobile phones to receive the signal and then display on Notice board. Notice board is primary thing in any institution or organization. The widely used GSM is to facilitate the communication of displaying message on notice board via user’s mobile phone. The user name and mobile phone is thus fetched into the microcontroller. One user can use the Location Tracking Application. The name is displayed on the LCD (20X4) Matrix Display Array.

The notice board mainly focuses on transmission of data through air interface by the use of GSM through serial communication. The data will be processed by the microcontroller on both ends. GSM technology is used to control the display board and for conveying the information. The microcontroller that further displays it on notice board which is equipped with a LCD display interfaced to a microcontroller from PIC family duly powered by a mains supply. In this paper we discuss the implementation of a simple and cost effective system that assists users in tracking person within a campus environment.

The GSM technology is used here. GSM stands for Global System for Mobile Communication. With the help of GSM technology, it is possible to trace and find the location of person with the help of android mobile phones which the other person is using. GSM modem and interfacing software module written in embedded C to filter the location information like latitude, longitude, then converted into a format that can be displayed on LCD and Mobile Phone signal is sent from GSM modem. Android which is an open source has become most popular smart phone used by people. In recent years, more and more people have started using the smart phone and other mobile devices. The number of smart phone users is expected to reach two billion by 2015. The GSM modem receives a message from the authorized mobile phone and the message is extracted by the microcontroller from the GSM modem and is displayed on the LCD display board.

The main objective of this project is to develop a wireless notice board that displays messages sent from the user’s mobile. When a user sends a message from his mobile phone, it is received by a SIM loaded GSM modem at the receiver unit.

II. EXISTING METHODS

The Autonomous position detection and tracking system enhances the accuracy of locating friends and family member’s positions by using GPS and standard web technology. In this method Network connection is necessary and Application can be used with GPS enabled handset.

One can use Location Tracking App to provide users with real time data related to a person’s movements and location within a campus. In this method frequently update the tracked position details to the social networking websites such as Face book, Twitter etc.

With the help of GSM technology, it is possible to trace and find the Location of person with the help of 2G and 3G mobile phones which the other person is using. There are many applications on the internet through which one can detect the location of user but Users can track only College friends and colleagues within campus environment.

III. PROPOSED METHOD

This paper deals with advanced notice board. Notice board is primary thing in any institution or organization. The GSM is used to facilitate the communication of displaying message on notice board via user’s mobile phone. The user name and mobile phone is thus fetched into the microcontroller. One user can use the Location Tracking Application. The name is displayed on the LCD (20X4) Matrix Display Array. The data will be processed by the microcontroller on both ends. GSM technology is used to control the display board and for conveying the information. The microcontroller that further displays it on notice board which is equipped with a LCD display interfaced to a microcontroller from PIC family duly powered by a mains supply. In this paper we discuss the implementation of a simple and cost effective system that assists users in tracking person within a campus environment.

A. Major Units

Overall system is partitioned into two major design units.

1) LCD display unit
2) Microcontroller unit
3) GSM module
The LCD display is displayed the name. If we touch the any one name the signal is goes to the microcontroller. The microcontroller is used to send the information as a signal to GSM modem. The person’s are detected latitude and longitude. They are sending to mc who is to be identified by others. The location is identified by using latitude and longitude. Finally to displayed the exact location of the person. The mobile is necessary for the person who is to be identified by others. The mobile is not essential for the person who is searching any particular person. The microcontroller interface with LCD display, GSM module, touch screen.

1) Block Diagram

![Block Diagram](image1)

2) Circuit Diagram

![Circuit Diagram](image2)

B. Touch Screen Interface with Microcontroller

The library reads the X raw coordinates of a touch:

- X+ and X- are in high Z : RA0 and RA2 are inputs
- Y+ is set to +5V : RA3 is output high
- Y- is set to 0V : RA1 is output low
- X+ voltage is read by ADC
- Y+ is set to 0V : RA3 is output low
- Y- is set to 5V: RA1 is output high
- X- Voltage is read by ADC and averaged with X+ value, the result is the raw X coordinate.

X and Y raw coordinates are then adjusted using calibration coordinates to get X and Y coordinates in pixel.

To Interface Resistive touch screen with a microcontroller, need a microcontroller with inbuilt Analog-to-Digital converter having two or more channels. This is needed because, the touch screen will provide data in terms of an analog voltage on two different pins using which, to determine position of the touch. Also, ADC input pins of the microcontroller should be configurable as General Purpose I/O (GPIO). As shown, in the figure, the touch screen has total of 4 wires coming out. Pin configuration is shown in the fig. To read the position of the touch, we have to first read touch position sequentially i.e. first read X position and then read the Y position. To do this, connect X1 and Y2 pins of touch screen to ADC multiplexed GPIO pins of the controller. And connect X2 and Y1 pins of touch screen to simple GPIO pins of the microcontroller.

<table>
<thead>
<tr>
<th>Touchscreen Configuration</th>
<th>X1</th>
<th>X2</th>
<th>Y1</th>
<th>Y2</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Measure X position</td>
<td>Logic High (+5v or +3.3v)</td>
<td>Logic Low (0V)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>To Measure Y position</td>
<td>ADC</td>
<td>Logic Low (0V)</td>
<td>Logic High (+5v or +3.3v)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Touch screen configuration

To read X position of the touch, for that, we have to program the pin X1 as Logic high (+5v or +3.3v in some cases) and configure pin X2 as logic low (GND). Now touch screen contains a resistive layer in both directions. So, when we apply +5v and GND to its pins, it will create a voltage gradient in X direction. Voltage on the X channel will vary according to the X position of the touch. We have to measure this voltage to determine the X position.

For that, configure Y2 as ADC input and configure Y1 as high impedance state (in most controllers, configuring Y1 as “Input” will work). Then read the value from the ADC. It will give the relative value of the touch. For example, if we have an 8-bit ADC in the controller, when touch near the right most ends, it will give you a value of 255 and when touch near the left most end, it will give a value near 0. After reading X position, we will have to read the Y position. For that, configure Y2 as Logic High, Y2 as Logic Low, and X1 as ADC input and X2 as high Impedance state. After that, whole procedure is the same.

C. Interfacing of GSM Module with PIC16F877A

To interface PIC16F877A microcontroller with SIM900 GSM module you only need to connect transmit and receive pins inversely with each other through voltage converter circuit. By inversely, I mean RXD pin of microcontroller connect with TXD pin of GSM module and TXD pin of microcontroller connect with RXD pin GSM module. We need only these two pin to send message, to receive message, to make call and to receive call on GSM module through microcontroller.

![GSM Module Interfacing](image3)
The above voltage converter circuit has three diode in series are used to drop down voltage of TXD pin of microcontroller to 2.9 volt which is unacceptable range for RXD pin of GSM module. TXD and RXD pin of PIC16F877A microcontroller. Similarly diode and 5 volt source is used to increase voltage of TXD pin of GSM module to 5 volt which is logic high for RXD pin of PIC16F877A microcontroller

D. LCD Module Interface with PIC16F877A

A common controller chip used in many alphanumeric LCD modules is the HD44780. The purpose of the controller is to generate pixel patterns and drive individual pixels of the LCD to show characters and symbols. In this method the main microcontroller running our application code does not need to generate the pixel patterns, it just need to tell the controller chip which character or symbol to show the rest is done by the controller. The same controller chip is used in many differently sized alphanumeric LCDs. Thus the connection schematic and driving code is same.

IV. RESULTS AND DISCUSSION

The entire user names are displayed in the notice board by touching the appropriate user GSM module will send the message to that particular user to identify the location. After detecting the exact location of the person, message is displayed in the notice board.

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REFERENCES


