

RFID-GSM INTEGRATION FOR ENHANCING PUBLIC TRANSPORTATION SERVICE

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ABSTRACT

This project is implement a solution for enhancing public transportation management services based on RFID AND GSM. Travel time information is a vital component of many intelligent transportation system (ITS) application in recent years. A desirable strategy to deal with such issues is to shift more people from personal vehicles to public transport by providing better service. In this proposed system we are introduced APTS for public service The number of vehicles in India has increased tremendously Leading to server traffic congestion and pollution in urban areas Particularly during peak period.. In this project we focus on public transportation system such as buses and minibuses. the goal of the project is to design the smart/intelligent unit attached to communicate with each other and also display the smart intelligent unit through wireless technologies. The proposed offline Intelligent Public Transportation Management System it will detect the addicted person such as alcohol detect it will reducing accidents. Here we propose a method software as well as framework as enabling technologies to for evaluation. Planning and future improvement the public transportation system even though can be as whole or parts can be applied all over the world we mostly target developing countries.

Keyword : - RFID , GSM, ITS.

1. INTRODUCTION

The project aims in designing a system which is capable of predicting the bus travel location to the user on his request. The system makes use of GSM modem and RFID receiver, Microcontrollers to achieve the task. Travel time information is used in many intelligent transportation systems (ITS) applications. In recent years, the number of vehicles in India has increased traffic and pollution in urban areas, particularly during the periods. It has shift more people from personal vehicles to public transport and it provide the better service (comfort, convenience etc). In this proposed system we have to introduced advanced public transportation systems (APTS) for public service and management service. Advanced public transportation system (APTS) is one of the most important applications, which can improve the traffic situation in India and such application will be to provide accurate information about bus and passengers, and reduced waiting times at bus stops. This needs a real-time data collection technique, a quick and reliable prediction technique to calculate the real-time data and informing the passengers regarding the same. This system is to use positioning system data collected from public transportation buses on urban area. We can developed the advanced public transportation systems (APTS) in India. The work presented here is one of the first attempts at real-time short-term prediction of travel time in Indian traffic conditions. The controlling device of the whole system is microcontroller. The project makes use of Microcontroller, GSM modem, RFID module and LCD display unit. The user needs to send his destination in the predefined SMS format to the bus depot number. The SMS will be received by GSM modem in bus depot and fed to Microcontroller. The Microcontroller receives the

information from RFID data of current location and sends data information to the user mobile. The Microcontrollers used in the project are programmed using Embedded C language.

1.2 Necessity:

Travel time information is a vital component of many intelligent transportation system (ITS). In recent years, the number of vehicles in India has increased traffic and pollution in urban area, particularly during periods. A desirable strategy to deal with such issues is to shift more people from personal vehicles to public transport by providing better service. In this proposed system we introduced advanced public transportation system (APTS) are one of the most important application which can improve the traffic and traffic situation in India.

1.3 Objective:

This system which is capable of predicting the bus travel location to the user on his request. The system makes use of GSM modem and RFID receiver along with microcontrollers to achieve the task.

1.4 Organization:

An embedded system is a combination of software and hardware to perform a dedicated task. In this system used embedded products such as Microprocessors and Microcontrollers. Microprocessors are referred to as general purpose processors and they accept the simple input and process on it and they give the output. In this system microcontroller not accepts the data as inputs and in which interfaces the data with other device and also controls the data and gives the result.

The project “**RFID-GSM Integration for Enhancing Public Transportation management Service** using PIC16F877A microcontroller is an exclusive project which is used to find the position of the bus on the earth. This information is provided by the RFID. In this project “**RFID-GSM Integration for Enhancing Public Transportation management Services**” using PIC16F877A microcontroller.

2. LITERATURE REVIEW

2.1 History:

The omnibus the first organized public transit system within a city, appear to have originated in Paris, France in 1662 although the service in question failed a few months. There is evidence of scheduled “bus route” from market street in Manchester to Pendleton in Salford UK which was started by John Greenwood in 1824. Another claim for the first public transport system general use originate in Nantes, France in 1826. Improvement in the speed of coaches seen in Britain with introduction of the mail coach in 1784.

2.2 Block diagram:

RFID - GSM Integration for Enhancing Public Transportation management Services

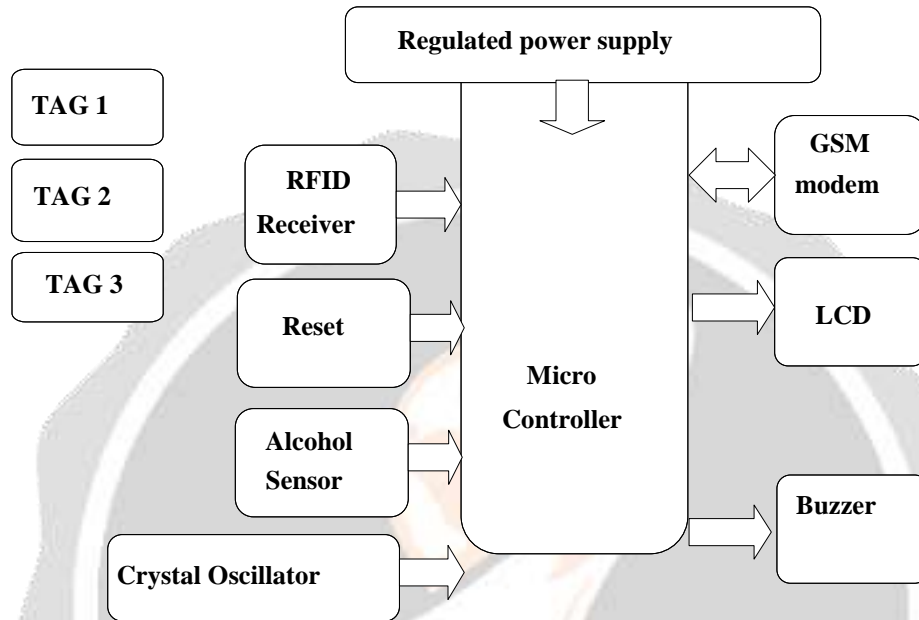


Figure 2.2: block diagram of RFID-GSM Integration for Enhancing Public Transportation management Services

2.3 Circuit diagram:

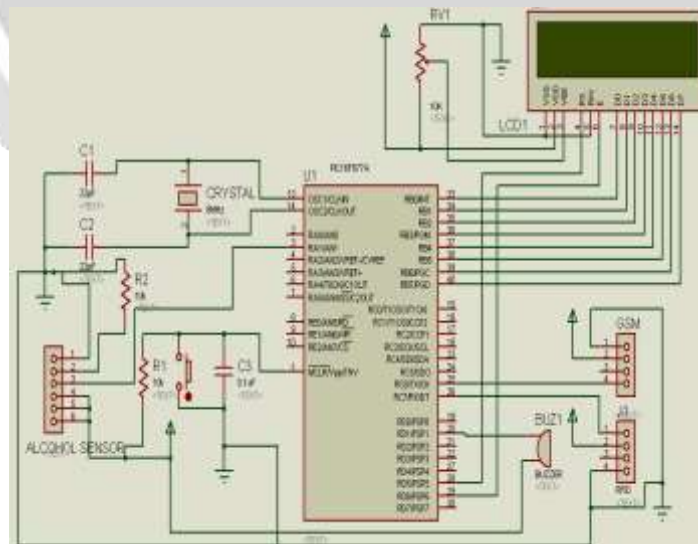


Figure 2.3: Circuit diagram of RFID-GSM Integration for Enhancing Public Transportation management Service

2.4 Pin diagram:

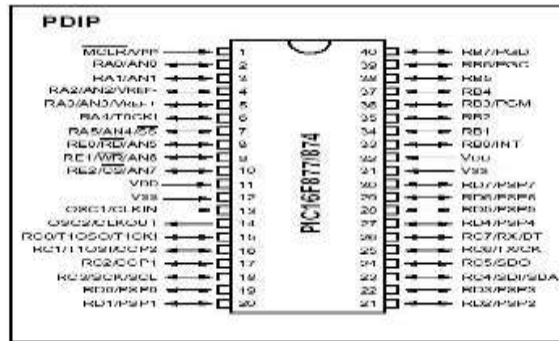


Figure 2.4: pin diagram of pic16f877a

3. HARDWARE DESCRIPTION

3.1 Micro controller PIC16F877A:



Figure 3.1: Microcontroller (PIC 16F877A)

The microcontroller used in this project is PIC16F877A. The PIC microcontroller are developed by Microchip Technology This is the most popular microcontrollers. There are basically four families of PIC microcontrollers:

PIC12CXXX 12/14-bit.

PIC 16C5X 12-bit.

PIC16CXXX and PIC16FXXX 14-bit.

PIC17CXXX and PIC18CXXX 16-bit.

PIC stands for Peripheral Interface Controller. Microchip Technology to identify its single-chip microcontrollers. These devices is 8-bit microcontrollers device. The main reason is Microchip Technology has continuously upgraded device architecture, this microcontroller is use customers' requirements. Microcontroller development tools is easily available on the internet at www.microchip.com. This tool is assembles and simulator etc.

PIC 16F877A Specification:

RAM	368 bytes
EEPROM	256 bytes
Flash Program Memory	8k words
Operating Frequency	DC to 20MHz
I/O port	Port A,B,C,D,E.

3.2 GSM (Global System for Mobile Communication):

GSM stands for Global System for Mobile communication. GSM is the world's most widely used cell phone technology. This Cell phones use a service carrier. Network of GSM has searching for cell phone towers in the urban area. Global system for mobile communication (GSM) is accepted standard. GSM is the standardization group established in 1982. This GSM create a common European mobile telephone standard. The pan-European mobile cellular radio system operating frequency at 900 MHz. GSM is estimate that many countries.



Figure 3.2: GSM (Global system for mobile communication)

3.2.1 GSM Interfacing:

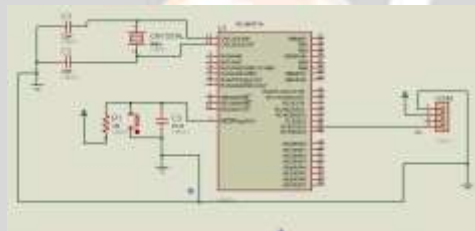


Figure3.2.1: GSM interfacing with PIC16F877A Microcontroller

GSM is connected to tx pin that is 25 pin number of controller.

3.3 RFID Module:

In general terms, RFID (Radio Frequency Identification) is a means of identifying a person and also identify the object using a radio frequency transmission. The technology used to identify wide variety of object and also track and detect a wide variety of objects. Communication takes place between a reader and a transponder called a tag. Tag is active or passive tag. Active tag is powered by battery and passive tag is powered by the reader field, and come in various forms including Smart cards, Tags, Labels, watches and even embedded in mobile phones. The communication frequencies used. This frequency range from 125 KHz to 2.45 GHz. RFID module is connected to receiver pin that pin number 26 of controller.

3.3.1 RFID interfacing:

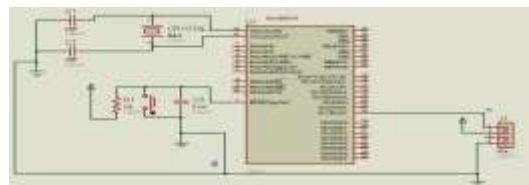


Figure 3.3.1: RFID Interfacing with PIC16F877A Microcontroller

RFID module is connected to receiver pin that is pin number 26 of controller.

3.4 RFID TAG:

An RFID tag Id is microchip containing identifying information and antenna that transmits this data wirelessly to a reader. The chip will contain a serialized identifier, or license plate number, that uniquely identifies item, similar to the way many bar codes are used. RFID tags have higher data capacity than their bar code counterparts.



Figure 3.4: RFID TAG

This increases information that can be encoded on the tag, including the manufacturer, weight, ownership, destination and history. In fact other types of information can be stored on RFID tags, depending on application. The RFID Tags come in a variety of types. In which Key variables include “Read-only” and “read-write”. There are three options how data can be encoded. The Read-only tags contain data such as a serialized tracking number which is pre-written onto them by the tag manufacturer. The least expensive tags they cannot have any additional information included. “Write once” tags user to write data to the tag one time in production processes. This may include a serial number. Full “read-write” tags allow new data to be written to the tag and even written the original data.

3.5 Alcohol Sensor:

Sensitive material of MQ-3gas sensor is SnO₂which with lower conductivity in clear air When the Target alcohol gass exist. The sensor’s conductivity is more higher along with the gas concentration rising. Please use simple electrocircuit, convert charge on conductivity to correspond output signal of gas concentration.MQ-3 gas sensor has high sensitivity. Alcohol has good resistance and this resistance disturb of gasoline Smoke and vapor. The sensor could be used to detect alcohol with different concentration, It is with low cost and suitable for different application. Alcohol Sensor is connected to pin number 3 of controller.

3.5.1 Alcohol Sensor Interface:

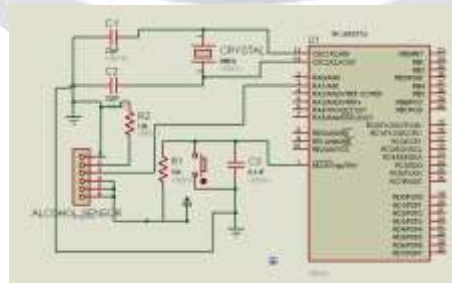


Figure 3.5.1: Alcohol Sensor interface with PIC16F877A Microcontroller

Alcohol Sensor is connected to pin number 3 of controller.

3.6 Buzzer:

Buzzer is a device used for beep signal. This will help us to make understand information or message. A buzzer is usually electronic device used in automobiles, household applications. It mostly consists of switches or sensors connected to a control unit. In which button was pushed. Control panel, and sounds a warning continuously or intermittent buzzing sound. This device is based on an electromechanical system, this system is identical to an electrical bell. Buzzer is connected to pin number 20 of controller.

3.6.1 Buzzer Interfacing:

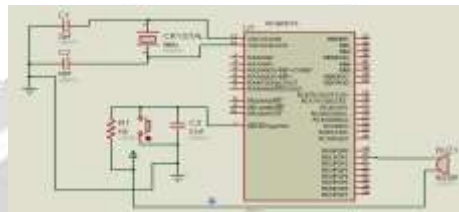


Figure 3.6.1: Buzzer Interfacing with PIC16F877A Microcontroller

Buzzer is connected to pin number 20 of controller.

3.7 LED:

Stand for “Light-Emitting Diode”. An LED is an electronic device that emits light when an electrical current is passed through it. LED produce Red light, but modern LEDs can produce the different colors, such as red, green, and blue (RGB). Advance LED technology has produce white light. LEDs are commonly used for indicator lights, such as power ON/OFF lights on electronic devices. They also have other applications, such as electronic sign and clock displays, and flashlights. Since LEDs energy efficiency have a long lifespan more than 100,000 hours, they have to replace traditional light bulbs in several areas. Some example include street light, the red lights on cars and various types of decorative lighting. Typically identify LEDs by a series of small lights that make up a larger display. The LED is passive and optoelectronic, its working principle Electroluminescence and its firstly invented Oleg lose in 1927, first p0roduction October 1962. A light-emitting diode is a two –lead semiconductor light source. It is p-n junction diode, which emits light when activated. When a suitable voltage is applied to electrons are recombination with electron holes in the device, In which releasing energy in the form of photon. This effect is called electroluminescence, and color of the light (corresponding to the energy photon)is determine by the energy band gap of the semiconductor.

3.8 Crystal oscillator:

The crystal oscillator can be connected to the PIC microcontroller. The range of microcontroller DC to 20Mhz. Mostly 20Mhz oscillator will be used and the price is very cheap. The 20 MHz crystal oscillator connected with about 22pF capacitor. There are 5 input/output (I/O) ports on PIC microcontroller port A,B,C,D and E. Each port has different function. It can be used as I/O port.

3.9 LCD:

One of the most common device, this device is attached to a microcontroller is an LCD display. Most common LCD’s connected to the microcontrollers such as 16x2 and 20x2 displays. This means 16 characters per

line by 2 lines and 20 characters per line by 2 lines, respectively. As previously mentioned, it takes a certain amount of time for each instruction to be executed by the LCD. The delay depending on the frequency of the crystal attached to the oscillator input of the LCD. The instruction is being executed. It is possible to write code and waits for a specific amount of time, Then allow the LCD to execute instructions, this method "waiting" is not very flexible. If the crystal frequency is changed, the software will be modified. A more programming is to use the "Get LCD Status" command to determine the LCD is still busy, and executing the last instruction received. the information is useful in DB7.

3.9.1 LCD Interfacing:

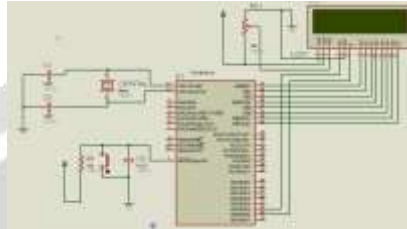


Figure3.9.1:LCDInterfacing with PIC16F877AMicrocontroller

3.10 Design of Power Supply:

The basic step in the designing the power supply required for that system. There are many types of power supply. Most are designed to convert high voltage AC to low voltage supply. That means electricity to a low voltage supply for electronic circuits and other devices. The steps involved in the designing of the power supply are given bellow.

- 1) Determine the total current the system sinks from the supply.
- 2) Determine the voltage required for the different components.

Transformer

The winding (coil connected) to the AC supply is called as primary winding while as the other one connected to the load is called as secondary winding .Here we are using step down transformer. It steps down high voltage AC mains to low voltage AC.

Rectifier

It converts AC to DC, but the DC output is varying. A full wave bridge rectifier is used since it has a high efficiency of 81.2%.

Filter

Filters are usually categorized by the manner in which output voltage varies with the frequency of input voltage. It filters the DC from varying greatly to a small ripple.

Regulator

It eliminates ripple and provides stable voltage. The output from regulator is always a DC.

3.11 Software Implementation:

Layer Of PCB:

- BOT - bottom copper
- SMB - Solder mask bottom
- SST - Silk screen top
- ASY - Assembly top, contains the board outline
- DS - drill sizes

3.11.1. SOFTWARE USED-“PROTEL99”

- Start PCB design section
- Place all component in manually or automatically.
- Check design rules.
- Route the PCB
- We display the PCB layout of designed circuit.
- Adjust the layout in mirror image.
- Print the PCB layout.

3.11.2 Proteus:

Proteus is software. In which accepts only the hex files. the machine code is converted into hex code, Then that hex code has to be dumped into the microcontroller, and this is done by the Proteus. Proteus is programmer software which contains a microcontroller in it. This microcontroller has a written the program then accepts the hex file from the pic compiler, and dumps this hex file into the microcontroller.

4. PERFORMANCE ANALYSIS

4.1 Snap Short

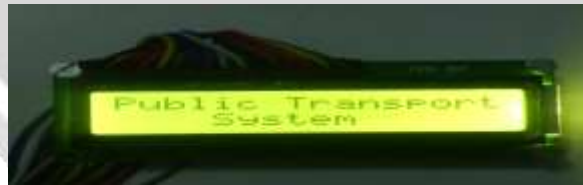


Figure4.1.1: Public Transport System



Figure 4.1.2 Bus reaches at Beed station



Figure 4.1.3: Bus reaches at Ahmednagar station



Figure 4.1.4: Alcohol detected

4.2 Result

The project is mainly intended to find location & nearby position of vehicle is transmitted to owner. Give the SMS to owner at his request using RFID, GSM modem. The controlling device of the whole system is microcontroller. The project makes use of Microcontroller, GSM modem, RFID module and LCD display unit. The user needs to send his destination in the predefined SMS format to the bus depot number.



Figure 4.2: Result of the project

5. CONCLUSIONS

“Transportation management Services” was designed such that the location of the bus or vehicle is transmitted. To send the SMS to the owner on his mobile phone at his request using RFID and GSM modems. This SMS is the short message. This system also enables to monitor the accident situations and it can immediately alert the people with the location of accident.

5.1 Cons

1. Highly efficient and user friendly design.
2. Easy to operate.
3. Low power consumption.
4. Location of the vehicle (bus) can be known using RFID.
5. Efficient design.
6. Works anywhere in the world (GSM availability).
7. In case of emergency intimation (accident) can be sent to predefined numbers.

5.2 Application

1. Improve the traffic situation in India.
2. Provide accurate information about bus arrivals to passengers.
3. Find the location and position of bus.

6. REFERENCES

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