IOT Based Efficient Vehicle Location Help Line System Using NFC

P.Sukumar
Associate Professor/ECE/ Nandha Engineering College/Erode/Tamil Nadu/India.

Dr.S.Ravi
Senior Lecturer/ Faculty of Electrical Engineering/
Botswana International University of Science and Technology/ Palapye, Botswana.

Abstract – Now-a-days increasing density of vehicles on road is becoming the problem for the traffic control. Ultimately arising obstacle in the managing and tracking of the vehicle. Because of the problem state, it is necessary for every organizations and individuals to track the vehicle. People will monitor and track their vehicles for the safety concerns with the help of our project. Public transport and private buses tracked to citizens with traffic and transportation details like location, crowd, etc. The proposed system will be used for the positioning of the bus from remote location. Once the NFC tag is scanned and identified, it generates the code corresponding to the location it reached and updates to the end user, when he uses to view the last location of the bus. As before GPS systems are used which locates the bus only in the metropolitan cities and once it deviates from the location, the information will be lost. Here, in this project a NFC reader is fixed in every bus stop and once the bus crosses the stopping the microcontroller updates the location to the IOT and once we access the page it shows the last location and the time it has crossed the location, so that we can update the time the bus will reach us.

Index Terms – NFC, MAX 232, GPRS, IOT.

1. INTRODUCTION

Now-a-days, due to growing world & importance of the time in day to day life there is need of effortless transport [1]. So we are providing an IOT application which will provide the information of vehicle location tracing and monitoring [3]. It also includes the feature of density measure for the user convenience and nearest bus available on the route and will make the user up to date as bus moves.

As we know the lots of work is done previously on this system to provide the user what they need & is to solve the various challenges. So to reduce the extra efforts to track the object and also to improve the previous demerits.

2. LITERATURE REVIEW

[5] GPS is more popular technology which is used in many applications. This existing system gives information about vehicle position and route travelled by vehicle and this information can be monitor from any remote place or location. This system depends on GPS and GSM technology. This system lags in some features like its track vehicle only on PC not on mobile. And also there is no application depending on mobile device to track and get a real time and current view of target or vehicle [5].

[8] Tracking systems are rarely available in the market and available systems are not good and effective systems are costly. The above stated system is much economical than other system. This suggested system helps to getting information and location of college bus by using mobile or smart phone. But we got some lagging points in this system, there is only provision for tracking & this tracking is based only on SMS. There is no real time view of location for bus and also there is no any application based on mobile for tracking [8].

[13] The above mentioned paper includes the integrated use of the smart cards with GPS system. In today's world smart cards became mostly used things which contains the user's data and GPS used in many areas like tracking and monitoring or surveillance which is used in this system for finding the actual distance travelled by that passenger. The given system does not provide the facility like ticketing and also it has shortcoming like passengers can't buy tickets, who don't have smart card. The system does not gives the dynamically changing the bus routes [13].

[1] The above stated existing system is based on the ticketing & identifications in the public transports for bus passengers. There are many passengers having more confusion about fares and which leads to corruption. System will provide automatically fare collection of passengers according to travelled distance. This system uses RFID & GPS for transactions and it make traveling is very precise. This system has some shortcomings as like system provide only automated ticketing facilities not provision for tracking the bus. And also there is no provision for crowd (density) measurement. This system has not any kind of user application for passengers to track the bus and view the schedule of buses [1].

3. PROPOSED SYSTEM

A. Introduction

Now-a-days, due to growing world & importance of the time in day to day life there is need of effortless transport. So we are also providing a webpage application which will provide the all system information of vehicle tracking and monitoring. It also provides the feature of nearest bus available on the route and will make the user up to date as bus moves.

The location of the bus can be observed continuously using NFC system. The NFC card transmits signals to a NFC reader. These readers statically receive signals. These signals are then transferred to IOT web access that indicates the location and time of the vehicle.

The NFC Card provides authentication, identification, application processing along with data storage. Every bus will carry the NFC card. The Card holds information of the bus such as name, bus number, owners' information. By integrating both IOT technology and NFC cards we are going to design a whole bus tracking system.

Whenever the passengers standing in the bus stop he/she can be accessed to the web to view the last station of the bus and the time it crossed. If NFC card is shown to the reader, the microcontroller attached with the reader transmits the location and the time it crossed using a GPRS modem. According to Source and destination the time it will reach us can be estimated.

B. Architecture

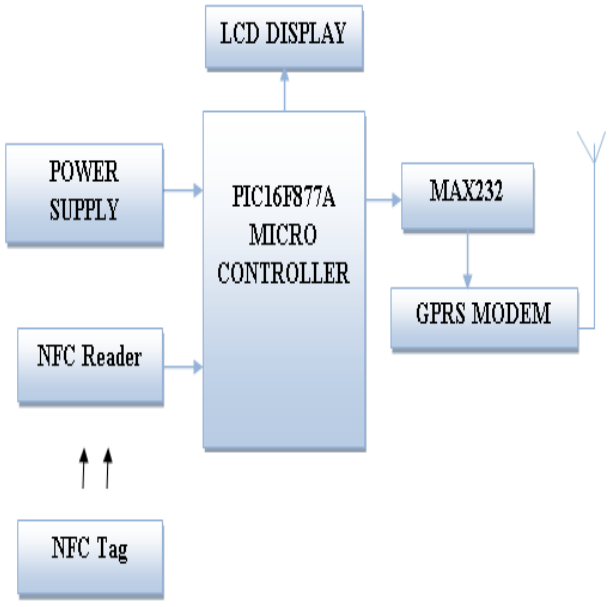

Figure 1: Architecture of bus tracking system

Architecture of IOT supported bus tracking & Updating system includes

1. Architecture of Tracking System
2. Architecture of IOT access

The architecture has a NFC module of transmitter and receiver, PIC16F877A micro-controller, GPRS modem interlinked by a pair of MAX232 IC's.

For the purpose of tracking NFC kit enabled by the USART's receiver pin is used and for IOT access the GPRS connected with MAX232 to the transmitter pin of USART is used.

Figure1 shows the architecture of Bus tracking system:

The fig.1 shows the tracking system architecture, which defines the intercommunication among these components. The basic level components include server, databases, and communication networks along with satellite.

User application is http based application which will include the GPRS tracker. The general information feed is given by the user application which will send to the server for further operation. The general feed may include the current location, destination location, timing, etc.

In fig.1 the Server includes the database containing the vector table of location name and it's coordinates along with the number of buses available at that location at a specific time. This database on the server automatically updates using GSM.

The current location coordinates are directly taken by the application and search for the nearest bus. If the nearest bus is crowded then it again performs the search operation to locate the next available bus with its time and current location.

C. Internet of Things – An overview.

The new rule for the future is going to be, "Anything that can be connected, will be connected."

This is the concept of basically connecting any devices with an ON and OFF switch to the internet (and/or to each other). This includes everything from cell phones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else you can think of.

This applies to components of machines, for example a jet engine of an airplane or the drill of an oil rig.

The commands used for the interpretation with IOT device are;

AT+CMGF –

AT+CIPSTATUS – To get the status of the program.

AT+CSIT – To view the network provider.

AT+CIFSR – To get our IP address (if needed).

AT+CIPSTART – To ping the IP address.

AT+CIPSEND – TO transfer the information.

D. Near Field Communications:

NFC tags are passive data stores which can be read, and under some circumstances written to, by an NFC device. They typically contain data between 96 to 8192 bytes and are read-only in normal use, but may be re-writable. They are based on existing radio-frequency identification (RFID) standards including ISO/IEC 14443 and FeliCa.

NFC works totally in three modes:

NFC card emulation- enables NFC-enabled devices such as smartphones to act like smart cards, allowing users to perform transactions.

NFC reader/writer- enables NFC-enabled devices to read information stored on inexpensive NFC tags embedded in labels or smart posters.

NFC peer-to-peer- enables NFC-enabled devices to communicate with each other to exchange information in an adhoc fashion.

E. PIC Configurations

In this project, PIC16F877A is used. This is used because it has all the peripherals like Timer, ADC, PSP, USART, SPI, I2C, EEPROM, CCP, etc.

It is a 40 pin RISC machine of Haward architecture with following specifications:

- Operating voltage : 5 V
- Operating frequency : 4 MHz
- ROM : 8 kb
- RAM : 368 bytes

RISC has 35 instructions and the peripherals here to be enabled are USART and PSP.

Mnemonic, Operands		Description
ADDWF	f, d	Add W and f
ANDWF	f, d	AND W with f
CLRF	f	Clear f
CLRW	-	Clear W
COMF	f, d	Complement f
DECF	f, d	Decrement f
DECFSZ	f, d	Decrement f, Skip if 0
INCF	f, d	Increment f
INCFSZ	f, d	Increment f, Skip if 0
IORWF	f, d	Inclusive OR W with f
MOVF	f, d	Move f
MOVWF	f	Move W to f
NOP	-	No Operation
RLF	f, d	Rotate left f through carry
RRF	f, d	Rotate right f through carry
SUBWF	f, d	Subtract W from f
SWAPF	f, d	Swap nibbles in f
XORWF	f, d	Exclusive OR W with f
BIT-ORIENTED FILE REGISTER OPERATIONS		
BCF	f, b	Bit Clear f
BSF	f, b	Bit Set f
BTFSC	f, b	Bit Test f, Skip if Clear
BTFSS	f, b	Bit Test f, Skip if Set
LITERAL AND CONTROL OPERATIONS		
ADDLW	k	Add literal and W
ANDLW	k	AND literal with W
CALL	k	Call subroutine
CLRWDT	-	Clear Watchdog Timer
GOTO	k	Go to address
IORLW	k	Inclusive OR literal with W
MOVLW	k	Move literal to W
RETFIE	-	Return from interrupt
RETLW	k	Return with literal in W
RETURN	-	Return from subroutine
SLEEP	-	Go into standby mode
SUBLW	k	Subtract W from literal
XORLW	k	Exclusive OR literal with W

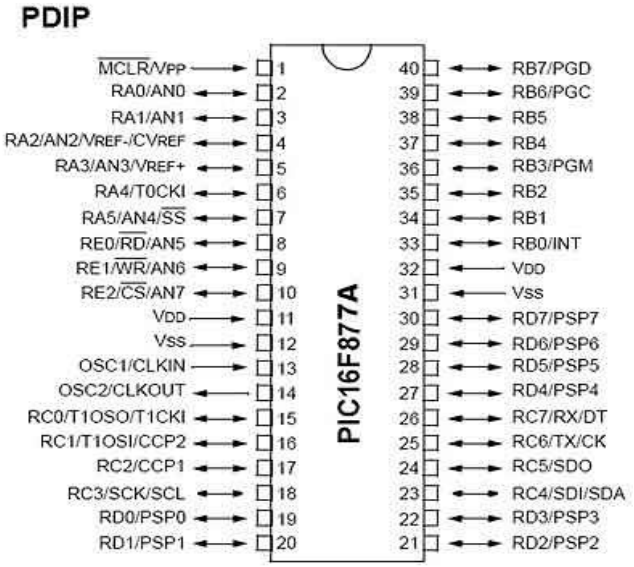

Figure 1: Pin configuration of PIC16F877A

USART:

Here, it is used to control the NFC and the IOT device. USART is a serial communication of 9600 bps. The receiver gets the information from the NFC tag and the transmitter sends the information to the IOT.

For the IOT transmission, two MAX232 IC's are used. One for the connection from PIC controller to the IOT interface's MAX232. Two IC's are used because of the variation in the operating voltage. IC provides 5 V and the IOT operates on 3.3 V. To compensate these conversions these IC's are interfaced.

PSP:

The Parallel Slave Port is used for the interfacing of LCD display to see the status of the kit.

LCD:

LCD is used here for displaying the current progress of the system. Here used is the 16*2 character display of 5*7 Dot-matrix board.

4. CONCLUSION

Bus tracking system is very useful and important mainly in rural areas as we can't predict the time of the arrival of the bus. This system has many advantages like user-friendly, wide coverage area, easy to implement in vehicles, cost is very less, more effective, huge capacity of bus inputs, etc. This system was made of a tracking module containing GPRS modem to access dynamic vehicle location and send it to server. Then people can access this information from their mobile phones.

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