

INTELLIGENT AUTOMOTIVE SYSTEM & TOLL COLLECTION USING RF-ID

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Abstract

In day to day life we face a lot of problems with our car. Now days easy bank loans and personal loans everyone can afford a car but due to the today's traffic conditions and alcoholic problems rash driving and accidents are very common. Also the toll collection systems are also privately administered. So sometimes the time delay required for collection is also more due to long queues. The emergency systems are very poor due to delay in the warning and only have limited range. This paper represents centralized embedded system which can solve all these problems by itself so that your car will be safer as well as sound. This system is a combination of all the previous systems as well as the new features has been added in this. It has several sections which perform various tasks and provide the information to centralized controller which perform analysis and provides data to the user.

Keywords- RFID reader

I. INTRODUCTION

Nowdays we face a lot of problems with our car. Now days easy bank loans and personal loans everyone can afford a car but due to the today's traffic conditions and alcoholic problems rash driving and accidents are common problems. Also the toll collection systems are also privately administered. So sometimes the time delay required for collection is also more due to long queues. Also the emergency systems are also very poor due to delay in the warning.

So to avoid such types of misbehaves we have proposed a new single centralized embedded system which can solve all these problems by itself so that your car will be more safe as well as sound. This system is basically a combination of all the previous systems as well as the new features has been added in this. It is basically has several sections which performs various tasks and provide the information to centralized microcontroller which perform basic analysis and provides data to the user.

The individual section performs different tasks so that if it fails we don't have to remove all the systems but to just replace the damaged or broken part. Also we can easily modify the part of the system as per our requirements.

So we are proposing a system which can monitor no. of factors as well as entities of the car to make it safer. As we are not able to avoid the accidents but we can reduce the factors which can cause the accidents. Also today time is money so we are making arrangements which reduce the time delays.

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This also has a new feature i.e. the traffic rules controller which is yet not implemented in any automotive system. Here the system monitors and keep records of the traffic rules violations and you will be charged with points so that you don't need to wait and pay for your mistakes after you had gain certain point this system warns you and car will be stopped for this then you need to pay the fine in R.T.O to get your car started.

This system can be applicable to any vehicle and automotive system and also the transport systems like trains with some new arrangements and modifications. This is more valuable but customizable and also the flexible system.

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II. Methodology

The basic challenge in this system is the individual sections of the system and the relevant communication between them. As this all sections monitored by a single system sections so we need to find a better solutions from the market.

we also thinking of a system with the CAN bus communication modules. But with the can bus we need to use the higher level microcontrollers which are providing much more facilities which are undesirable and also increase the cost of the total system. So we choose PIC18F versions which are more compatible with our requirements.

Also the toll collection the system is getting complex as we are using the computer interface. So the challenge will be to provide a such hardware as well as software interface which will be more suitable for computer as well as to the microcontroller. So the proposed work will be done on the VB 8.0 or the C# language which provide good quality graphical interface and also a better control.

During the research we have found no. of projects which solves various problems which we are going to have during this project. But they are increasing the overall cost of the project which is not applicable for our entire work. So the proposed system should also provide all the facilities from the previous projects but the overall cost should be less.

Also the main challenge was the communication link between all the sections. This should be high speed so that delay would be less. Otherwise in the emergency the system will not be useful. Also the second aspect was cost of the project. This should be as less as possible.[2]

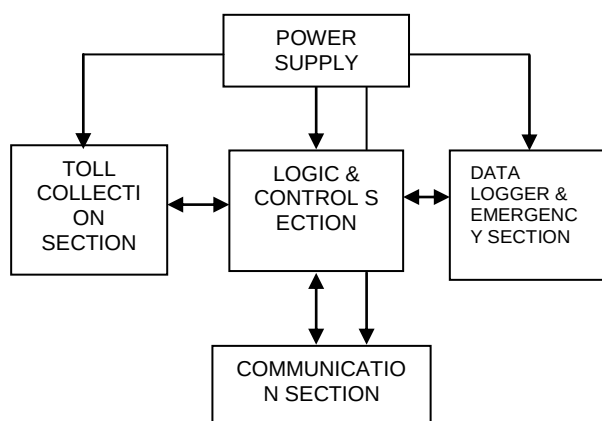


Figure 1: Fuctional figure

2.1 16F877A PIC MICROCONTROLLER:-

The system consist of PIC Microcontroller which is connected to all other distributed section & which monitored by a centralize section.As the car has been passes from the toll it will collect the toll amount and stores the record also

in the emergency case it will send the message nd call the respected person.

2.1.1 Peripheral Features:-

This is a 40 pin enhanced flash memory microcontroller. This is basically a RISC (Reduced Instruction Set Microcontroller) type microcontroller with only 35 single word instructions. Its operating speed is 200nS per instruction cycle with 20MHz I/p clock frequency with wide operating voltage (2.0V to 5.5V).

2.1.2 Analog Features:-

The PIC16F877A has 10-bit, up to 8-channel Analog-to-Digital Converter (A/D). It is also provided the analog Comparator module with two analog comparators, on-chip programmable voltage reference module, input programmable multiplexing from device inputs and internal voltage reference.

2.1.3 Program Memory Organization:-

The PIC16F87XA devices have a program counter of 13bit which has addressing of 14 bit program memory space x 8Kword. The PIC16F877A devices have 14 bits of Flashprogram memory x 8K words, while PIC16F8774A deviceshave 14 bits x 4K words. Wrap round is caused due to access of location which is above the physically implemented address.

2.1.4 Data Memory Organization:-

The data memory has multiple banks with the SFR that is Special Function Registers and the General Purpose Register set also self-programmed under software control.

2.2 Smart Card Reader:-

The samrt card is the chip which is plastic embedded card contains the computer chip which can stores thetransact data between the user. This data is associated with valu or the informationor the both and is stored and processed within the card's chip.

The data is transacted or read by the reader that is part of computing system.Smart card enhanced systems are use today throughout sevral keys applications which are healthcare,banking,tranportaiton & industries.

Markets that have been traditionally served by other machine readable card technologies such as bar-code and magnetic stripe are converting as the calculated return on investment is revisited by the each card issuer year after year. First introduced in Europe nearly three decades ago, smart cards debuted as a stored value tool for pay phones to reduce theft.

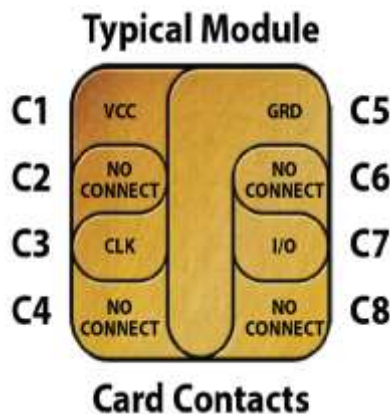


Figure 2: Pin diagram of smart card

2.3 RF-ID Scanner :-

Radio Frequency Identification (RFID) technology has been attracting considerable attention with its promise of improved supply chain visibility for both suppliers and retailers. It will also improve the consumer shopping experience by making it more likely that the products they want to purchase are available. While the potential benefits of adopting the It requires lack of standards,system cots is alos less and have infrastuctural changes have resulted in a slow adoption of the technology. Recent announcements from some key retailers have brought the interest in RFID to the forefront.

- Low Frequency (125/134KHz) – it used for used for access control and asset tracking.
- Mid-Frequency (13.56 MHz) – Used where medium data rate and read ranges are required.
- Ultra High-Frequency (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) – This has long range of data read and heigher data speed rate.

Table No.I- RF-ID Frequency Bands

Frequency	Band	Range	Data Speed
150 kHz	LF	20 cm	LOW
13.5 MHz	HF	1 m - 1.5 m	HIGH
433 MHz	UHF	100 m	VERY HIGH

2.4.1 GSM module (SIM 900):-

The GSM SIM900 is basically the communication module which is Quad-band GAM/GPRS solution. SIM900 provided the GSM/GPRS,it has the frequency range of 850MHz for voice,900MHz for the SMS,1800MHz for DATA,1900MHz for Fax over performance for in a small form factor and with low power consumption..



Figure 3: GSM SIM 900 Module

III. RESULT

The basic challenge in this system is the individual sections of the system and the relevant communication between them. As this all sections monitored by a single system sections so we need to find a better solutions from the market.

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This system is provides better control over the vehicle but it requires more number of parameters to be sensed which should be accurately sensed by the sensor. During the turn the headlight should be turned also the ultrasonic sensor should give proper indication so that turning should be proper. It also should sense the RFID properly so that the system directly identifies the car and deduct the amount from our accounts.

This project will be effectively used inside the automotive industries with limited resources. This system is more reliable flexible as well as effective to use rather than others which requires individual support. This system is cost effective duo to use of limited resources more effectively.

IV. CONCLUSION

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