25. Radio Frequency Identification (RFID): An Automatic Identification System

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ABSTRACT

RFID Radio frequency identification is a form of wireless communication that uses radio wave to identify and track objects. Radio-frequency identification uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. [1] RFID (radio frequency identification) is a form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person.

Keywords— *Microcontroller 8051, Embedded C*

INTRODUCTION

The "Radio Frequency Identification (RFID) is an automatic identification system. RFID uses RF to identify "tagged" items .The tag items means identification of an object. This involves identification, location or specification about an object. Manual system to collect tall tax is time consuming. This reduces automatic fuel consumption. This technology ensures smooth flow of traffic in efficient and faster way by collecting the toll tax automatically. In this system drivers need not to take any cash is the one of the main benefit of electronic tolling system. The other benefits namely; less waiting time, reduction in vehicle emissions, increase in lane capacity etc, It will also help in controlling congestion level accurately.

Radio Frequency Identification (RFID) is a generic term for technologies that use radio waves to automatically identify people or objects from a distance of several inches to hundreds of feet. This ian Automatic identification (Auto-ID) technology [1] by which any object can be However, their possible area of use is much larger [4]. RFID terms as Radio frequency identification, It is wireless communication technology. Radio waves are used to automatically identify, track, and authenticate items or people by the RFID technology. RFID is an automatic identification like smart cards, bar codes, and voice recognition etc. used in machines to identify objects. [5] The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can be passed to computers to make use of it. [6]

Radio frequency identification (RFID) is a contactless form of automatic identification and data capture. Dating back to World War II, RFID transponders were used to identify friendly aircraft. The RFID system consists of a reader, transponder, and antenna utilizing several frequency ranges. Over 40 million RFID tags will be used in 1999 with sales projected to break the one billion-dollar mark before 2003 (Frost & Sullivan, 1997).Radio frequency identification is used in access control, asset control, and animal identification. The advantages of RFID are the capability for multiple reads, ability to be used in almost any environment, and the accuracy. The Automatic Identification Manufacturers, International Standards Organization, and the American National Standards Institute are currently developing standards. Barcodes have been developed in the railroad business to keep track of the various cars. Out of this system of identification grew the U.P.C. (Universal Product Code) which is now used in almost all manufactured goods. UPC is used to store the manufacturer code as well as the product code in a form that can be easily read by various scanners - even from a distance. But there are limits to the use of barcodes. There must be a direct line of sight between the reader and the code. The barcode can be obscured, for example by paint. One only has read-access to the data, i.e., one cannot add new data without adding another label. This is the point where a relatively new technology comes in: RFID (Radio Frequency

Identification). In RFID electronic chips are used to store data that can be broadcast via radio waves to the reader, eliminating the need for a direct line of sight and making it possible for "tags" to be placed anywhere on or in the product. One can even write to tags made of semiconductor chips, thus enabling updating of data. This write function introduces new capabilities, such as the updating of the manufacturing process of the attached item. RFID first appeared in tracking and access applications during the 1980s. These wireless AIDC systems allow for non-contact reading and are effective in manufacturing and other hostile environments where bar code labels could not survive. RFID has established itself in livestock identification and automated vehicle identification (AVI) systems because of its ability to track moving objects. To understand and appreciate the capabilities of RFID systems it is necessary to consider their constituent parts. It is also necessary to consider the data flow requirements that influence the choice of systems and the practicalities of communicating across the air interface. By considering the system components and their function within the data flow chain it is possible to grasp most of the important issues that influence the effective application of RFID. The RFID reader is designed for fast and easy system integration without losing performance, functionality or security. The RFID reader consists of a real time processor, operating system, virtual portable memory, and transmitter/receiver unit in one small self-contained module that is easily installed in the ceiling or in any other convenient location. [7].

RFID APPLICATIONS

Here are some RFID applications

- Credit card that you don't need to swipe
- Inventory tracking
- Attendance tracking
- Control access to secure building
- Tracking library books
- Manufacturing and Processing
- Inventory and production process monitoring
- Supply Chain Management
- RetaiInventory control and customer insight
- Auto checkout with reverse logistics Security
- Access control
- Counterfeiting and Theft control/prevention
- Location Trackin
- Traffic movement control and parking management
- Wildlife/Livestock monitoring and tracking

PROPOSED SYSTEM

This system provides fast and efficient method for toll collection. The major function of this system includes vehicle theft detection, automatic tax collections, tracking speed of vehicle and avoidance of signal breaking. These mechanisms are done by single RFID toll gate control. If vehicle is stolen it can be tracked by RFID toll gate control. In the database information of tag is stored. Vehicle identification number matches with the information of tag. If match occurs stolen vehicles are identified and are caught by the police. Even speed of vehicle above 100% accuracy can be caught. These mechanisms are done using single RFID tag therefore saving the efforts of carrying money and records manually. As explained in the figure 1, the RFID readers which are mounted on the toll booth will notify the arrival of the vehicle. The prepaid RFID tags are fixed on vehicles checks for the unique ID. If the vehicle is not registered then the tax is paid manually. If the ID is registered, it gets the details from the database and checks the balance amount and automatically deducts the required amount. In case of insufficient balance it deducts the amount from the account holder and shows negative value. Once the transaction is completed the gate is opened.
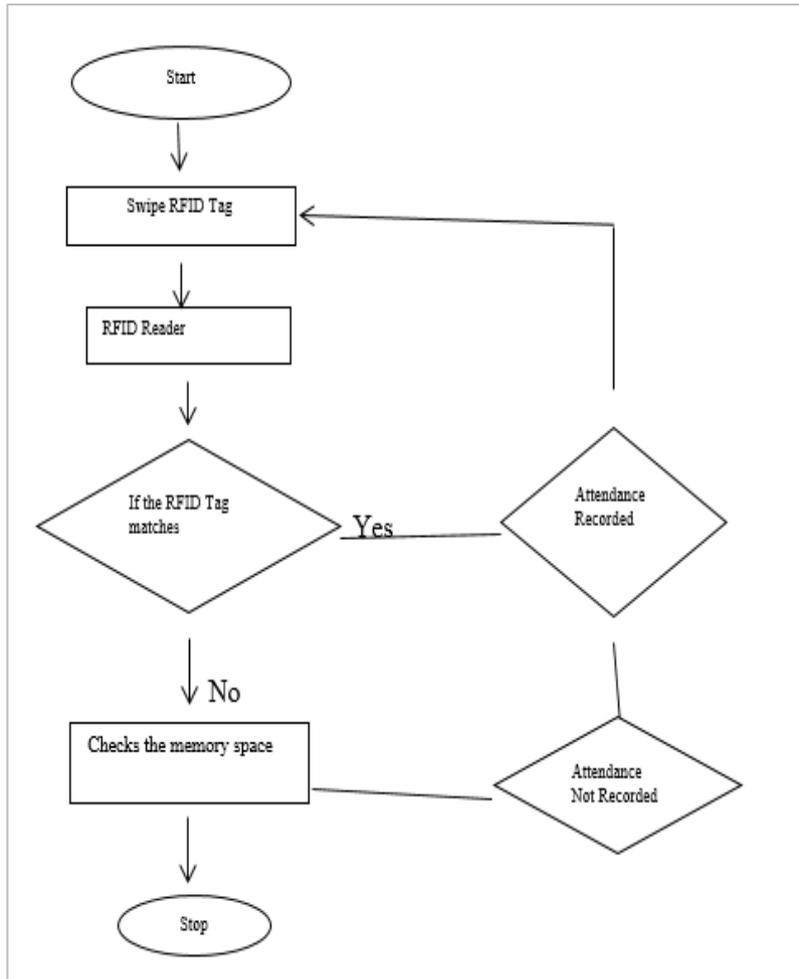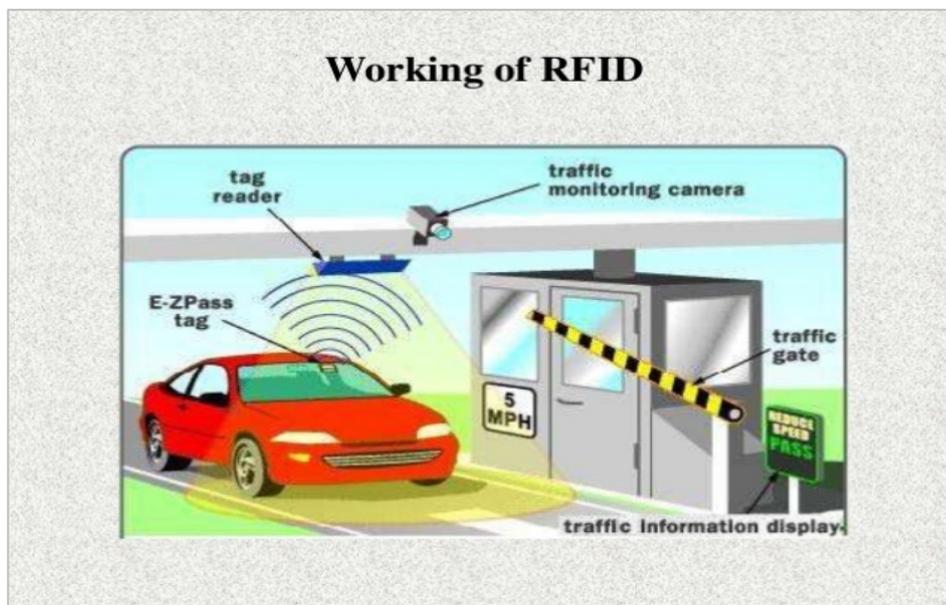
Figure 25-1 Proposed System

Figure 25-2 Working of RFID

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PROGRAM

```
C51 COMPILER V7.08   RFID                          02/28/2004 08:31:41 PAGE 1
C51 COMPILER V7.08, COMPILATION OF MODULE RFID
OBJECT MODULE PLACED IN C:\ISP's\SP_ISP\bin\Debug\RFID.obj
COMPILER INVOKED BY: C:\Keil\C51\BIN\C51.EXE RFID.C BROWSE DEBUG OBJECTEXTEND OBJECT
(C:\ISP's\SP_ISP\bin\Debug\RFID.obj)

   line level               source

   1          #include<reg51.h>
   2          #include<string.h>
   3          #include"lcd.h"
   4          #include"uart.h"
   5          char buf [20];
   6          int i=0,j=0;
   7          int count=0;
   8
   9          main ()
   10           {
   11   1      char buf1 [20] ="4600D04632E2";
   12   1      lcd_init ();
   13   1      init_uart ();
   14   1      //IE=0x90;
   15   1      for (i=0;i<12;i++)
   16   1      {
   17   2      buf[i] =uart_rx();
   18   2      }
   19   1      if (strcmp (buf1, buf) ==0)
   20   1      lcd_string ("id matched");
   21   1      else
   22   1      lcd_string ("id not matched");
   23   1
   24   1      //uart_tx ('A');
   25   1      //void harsh (void) interrupt [1] using [3]
   26   1      /*lcd_cmd (0x80);

   27   1      lcd_data ('h');
   28   1      lcd_data ('a');
   29   1      lcd_data ('i');
   30   1      lcd_cmd (0x84);
   31   1      lcd_string ("your name is");
   32   1      lcd_cmd (0x01);
   33   1      lcd_string ("harsh sahay");*/
   34   1      while (1);
   35   1      }
   36
   37


   MODULE INFORMATION: STATIC OVERLAYABLE
   CODE SIZE       =    246   ----
   CONSTANT SIZE   =     46   ----
   XDATA SIZE      =   ----   ----
   PDATA SIZE      =   ----   ----
   DATA SIZE       =     26     23
   IDATA SIZE      =   ----   ----
   BIT SIZE        =   ----   ----
   END OF MODULE INFORMATION.

   C51 COMPILATION COMPLETE.0 WARNING(S), 0 ERRORS(S)
```

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EXPERIMENT AND RESULT

The designed model of automatic tollgate system will automatically detects the identities of vehicles and performs the billing in accordance to the identity of each vehicle. Once all the rate. As all the test cases are passed system will automatically detect the vehicle. As the vehicles are identified doors are automatically closed or

opened. RFID tag are read are RFID those are present in each toll gate. The information of vehicle such as owner detail, vehicle number, vehicle tags number and owner bank detail will be stored in database of microcontroller. If the vehicle number does not match with the detail of the microcontroller the process is terminated. If the vehicle in the toll gate matches with the record of database processes are further processed. Based on the kind of vehicle the tax amount is automatically deducted from the owner's bank account. The information are sent to the owner's mobile by GSM service and the status of vehicle are displayed to the LCD scrren.There is no network problem for this process, vehicle have no need to wait in a queue. Tax amount those are paid to the vehicle differs from vehicle to vehicle.

REFERENCES

[1] IMPINZ

[2] RFID: RFID Introduction, Present and Future applications and Security Implications RFID Introduction, Present and Future applicationsandSecurity Implications Nandita Srivastava MSEEStudent George Mason University Advisor: DrJens PeterKaps

[3] International journel of electronics, Communication ISSN 1434-8411

[4] A survey on radio frequency identification (Rfid) trends

[5] Survey paper on Rfid: radio frequency Identification Dalvinder kaur#1, jyotsna sengupta#2,#1 student Department of computer sciencePunjabiUniversityPatiala,India,#2ProfessorDepartment of Computer Science, Punjabi University, Patiala,

[6] Rfid Technology: an overview .Amit kumar pal1.AkanshaTripathi2,AnupamSaigal1ResearchScolar,BundelkhandUniversity,Jhansi,India#2,Library Assistantship Nadar University,Gr. Noida,India3 Librarian,Subharti Institute of TechnologyandEngineering,Meerut,IndiaInternational Journal of Research, Granthaalayah

[7] Huge List of Seminar Topics 2020 2019 Home Electronics Radio Frequency Identification Device (RFID) www.seminarsonly.com.