© 2018 IJSRSET | Volume 4 | Issue 6 | Print ISSN: 2395-1990 | Online ISSN : 2394-4099
Themed Section : Engineering and Technology

Smart Parking System Using NFC

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ABSTRACT

In recent days the parking has become a serious issue and even worse, because of the rapid increase of automobiles everywhere. This paper proposes an automated guidance for user to park the vehicle and for managing and monitoring free parking space, it provides an intelligent solution. It leads to reduction in time and almost reduces the chances of entering into the wrong way which might lead to traffic jam.
Keywords : NFC, ATCS, UIN, OCR

I. INTRODUCTION

The Paper aims at developing an automated parking system for cars. This proposed system improves the recently used parking system by enhancing its security features and simplifying the parking process by eliminating the need for manual intervention. The parking system uses Near Field Communication NFC technology for authentication and owner car identification. NFC Module is widely present in today's vehicles and thus can be used to eliminate the need for parking tokens or cards. On the other hand, the automation process and space management is managed by the Aurdino board. The system run with pre-programmed controller to make minimum human involvement in parking system and ensure to access control in restricted places.

II. LITERATURE SURVEY

1. Karma Tsheten Dorjee This Paper is an innovative electronic parking payment system that provides the ultimate solution for drivers, municipalities and private parking lot owners.This enables the drivers to be charged for the exact period of time parked, while simplifying the monitoring and collection of parking fees.

2. R. Yusnita and F. Norbaya This paper aims to present an intelligent system for parking space detection based on image processing technique that capture and process the brown rounded image drawn at parking lot and produce the information of the empty car parking spaces.

3. Sager B. Shinde This paper aims is automated Toll collection framework is consider as a viable technic keeping in mind the end go to conciliate movement blockage and jams, upgrade the comfort and security of voyagers, and minimized fuel.

4. Bharambe S.R. The article gives a important guide line automated toll collection system ATCS using NFC and theft vehicle detection. ATCS emergence as a converging technology where time and efficiency are important in toll collection system now a days. In this, NFC tag will be place by authority having unique identification number UIN and user details. Active NFC tag will be attached to the vehicle. When vehicle passes thought the toll booth system, data on

NFC will be read by NFC reader and also send to the server for verification. Server will check details and toll amount will be deducted from uses amount. Theft vehicle detection is done with the help of various algorithm such as OCR and BLO detection.

III. SYSTEM ARCHITECTURE

Hardware Architecture:

a. ATMEGA 328 Controller

Figure 1. AVR microcontroller

The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port,6-channel 10-bit A/D converter 8-channels in TQFP and QFN/MLF packages, programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1MIPS per MHz.

b. NFC Reader

Figure 2. NFC Reader

Near-field communication NFC is a set of communication protocols .NFC devices are used in contactless payment systems, similar to those used in credit cards and electronic ticket smartcards and allow mobile payment to replace/supplement these systems. This is sometimes referred to as NFC/CTLS Contactless or CTLS NFC. NFC is used for social networking, for sharing contacts, photos, videos or files. NFC-enabled devices can act as electronic identity documents and key cards. NFC offers a low-speed connection with simple setup that can be used to bootstrap more capable wireless connections.

Software Architecture:

a. Arduino IDE Software

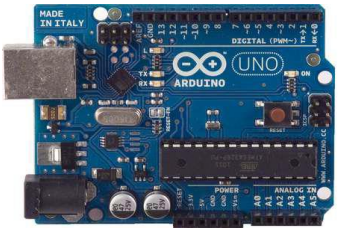

Figure 3. Arduino Board

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open-source, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time. For advanced Arduino users, prowl the web; there are lots of resources.

The Arduino project was started in Italy to develop low cost hardware for interaction design. The Arduino hardware comes in several flavours. The Arduino programming language is a simplified version of C/C++. If you know C,

Programming the Arduino will be familiar. If you do not know C, no need to worry as only a few commands are needed to perform useful functions. An important feature of the Arduino is that you can create a control program on the host PC, download it to the Arduino and it will run automatically. Remove the USB cable connection to the PC, and the program will still run from the top each time you push the

reset button. Remove the battery and put the Arduino board in a closet for six months.

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devicesThe project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog input/output I/O pins that can interface to various expansion boards termed shields and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus USB on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment IDE based on a programming language named Processing, which also supports the languages C and C++.

b. Visual Basics Software

Visual Basic is a third-generation language and integrated development environment IDE from Microsoft for its Component COM programming model first released in 1991 and declared legacy in 2008. Microsoft intended Visual Basic to be relatively easy to learn and use. Visual Basic was derived from BASIC, a user-friendly programming language designed for beginners, and it enables the rapid application development RAD of graphical user interface GUI applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects.

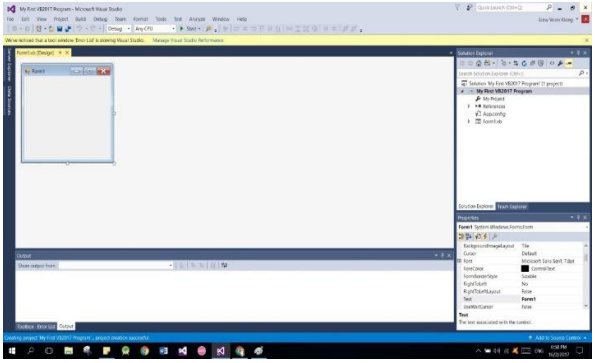

Figure 4. Sample Format of visual basic

IV. SYSTEM DESIGN

4.1 Hardware system:

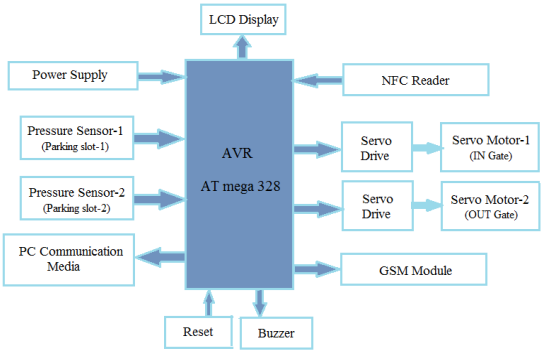

Figure 5. Block Diagram of Hardware system

4.2 Software system:

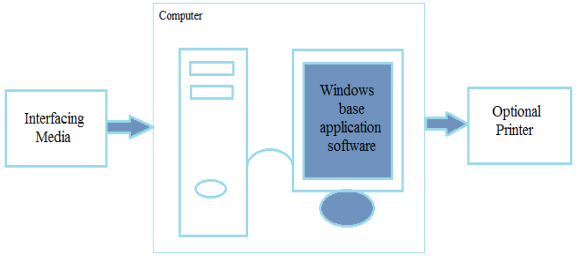

Figure 6. Block Diagram of Software system

4.3 Working

Here is the system to detect the NFC tag of the car using NFC reader. If the detection is successful then the IN gate will automatically open, on display shows empty parking slot there car will be park. If detection is fail that means does not found any details on that tag then need to be enter data manually in the system then gate will open.

In parking slot there used pressure sensor. When car entered in slot sensor will be activated. We getting IN time, similarly car out from slot we get OUT time. This IN and OUT details used for billing section. In this system we can pay bill online or offline also. GSM module is used for to send notification to client or user. Next purpose of GSM is to send bill receipt to client or user after billing process completed.

The block diagram mainly consists of four major parts which are detection unit, control unit, Software unit and display unit. Whole system is control with AVR controller. In this Paper we are using Atmega328 microcontroller. LCD is use to show status of the system. We are using 16X2 LCD which can shows 32 characters at a time. Buzzer is used to indicate the NFC detection problem. Power supply unit is used to provide working supply to all the blocks. Reset switch is used for reset the whole system.

AVR controller connected to computer via interfacing technic. In PC we design one controlling software with the help of visual basic. In this software we make one data sheet to maintain all user details. In details consist of, RFID number, vehicle number, Name, address, IN time, OUT time, total time, cost etc. so based on Input devises is will be automatically update in system to make our system automatic.
Also we can added the function of manual. If our system is fail to operate automatically because of any hardware part then we can also use manual mode.

V. PERFORMANCE ANALYSIS

LCD with Arduino Interfacing Simulation:

I. Welcome View-

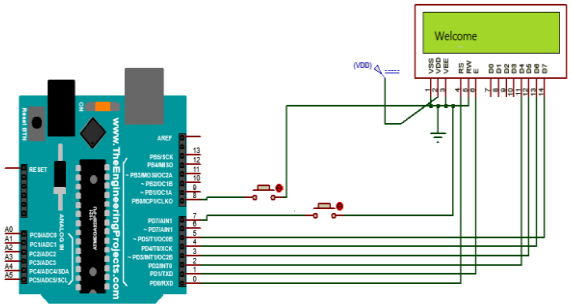

Figure 7. Welcome view of LCD with Arduino Interfacing

II. When NFC Successfully Detected:

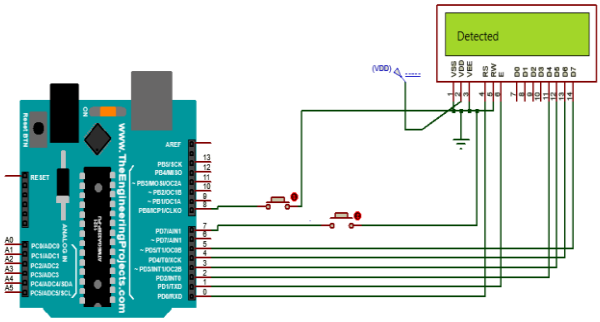

Figure 8. LCD interfacing view when NFC is successfully detected

III. When NFC Detection Fail:

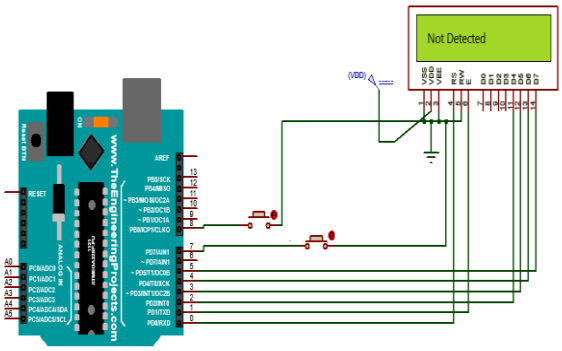

Figure 9. LCD interfacing view when NFC Detection Fail

VI. FUTURE SCOPE

Nowadays, it is mandatory to all the vehicle manufacturers' to fixed RFID card/tag, as per instructions given by RTO office. This Paper works only for these vehicle which are having RFID tag. But for old vehicles, administrator has to feed the details manually. It takes more time. To avoid this, we will add one more feature which will inform RTO office about these unregistered vehicles, so that they can force them, to fixed RFID tag/card. We will also Prepare online platform for this Paper where user can get the details of parking slots available, booking charges etc.

VII. CONCLUSION

Traffic problems in city arise mainly due to traffic congestion and insufficient parking spaces.

To overcome this problem we have designed this system.

VIII. REFERENCES

[1]. Karma Tsheten Dorjee,"RFID-Based Automatic vehicle parking system using microcontroller",'IJETT',Feb 2016,Volume 32 number,ISSN:2231-5381,page-192-194,south Sikkim,india

[2]. R. Yusnita, Fariza Norbaya, and Nora winawati Basharuddin, "Intelligent Parking Space Datection system based on Image Processing", 'International Journal of Innovation, management and technology', June 2012, Volume 3 number, Paper no 3, Page- no- 232-235, University Malaysia perlis, Malaysia

[3]. Sagar B. shinde, "Toll Automation System Using NFC",'JETIR', January 2016, Volume 3 number, Paper page no- 18-22, Moden Education society collage of Engg, Pune

[4]. Sarika Bharambe,"Automated Toll Collection System Using NFC and Theft Vehicle Detection",'IJECS',April 2016, Volume 05 no, Paper number. 05, Page Number 16107-16110, Bharti vidyapeeth engg college Pune, India

[5]. Mr. John nair, based on Innovative smart car parking system with NFC access, IJETR, April 2015, Volume 3 number, SSN: 2321-0861, page-476-478, India.

[6]. Janvhi Nimble based "Automatic smart car parking system", IJAECS march 2010, Volume- 3 Number, ISSN-2394:2835, Page 49-51, Talegaon Dabhade Pune.

[7]. Bharambe S.R based"Automated toll collection system using NFC and theft vehicle detection system",IJCSITR oct-dec 15, Volume- 3 number, Issue- 4, ISSN 2348:1196, Page 192-957, pune.

[8]. Mr. John Nair based Innovative smart car parking system with NFC access, IJETR April 15, volume 3 number, ISSN 2321:0879, Page 476-478, Mumbai