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Car Parking System using Arduino, RFID & GSM Module

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Abstract - The prevailing parking management systems require man power to supervise the operations and it also requires manual recording of data in excel sheets and on paper. For huge parking, scenario is extremely hectic to stay track of and therefore the human error also comes into the picture. Because of these issues, automation of the parking management system is required. Nowadays, the fashionable world requires smart cities and therefore the smart cities require automation techniques in its various aspects. The use of frequency Identification referred to as RFID technology reduces human efforts as Well as errors. That's why the RFID based smart parking management system has been proposed to solve the issues related to parking management. The proposed system in this paper consists of different technologies as well as some new enhancements which are namely, the utilization of GSM module, hour based money deduction, providing driver the choice of his preferred parking slot at the entry and sending the SMS of driver's chosen parking location to driver's registered mobile number which could be helpful if at the time of leaving, the driving force forgets where the car was parked. This makes the existing systems more trenchant, user-friendly and at an equivalent time, the proposed system also manages to be pretty thrifty. The approach in this paper realizes intelligent yet cost-effective management of parking zone and therefore the paper also tries to understand the Smart cities mission of the Government of the republic of India

***Key Words*: RFID, Smart city, Arduino, Controlling, , GSM**

1) INTRODUCTION

RFID is one among the foremost fundamental technologies that enables wireless data transmission. Although it has been known for a very longtime, has not been very often used in industry. The reason is it was expensive and no standardization among the manufacturing companies. It took a longtime for it to be widely utilized.

This technology older than bar codes. For the first time, RFID was used in World War II for airplane identification. In 1994, RFID technology was employed by all rail cars in us for identification. RFID tags are better than bar codes as they need longer life. The situation is changing in the present time. RFID systems are being used at very large scale throughout the world.

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2) METHODOLOGY

Make So in this project we are going to use the following components –

- Arduino Uno, ES-16 RFID Reader, RFID tag, GSM SIM 900 module, Wires, Arduino IDE, Buzzers, Barricade

Firstly we will connect the Arduino board with the GSM module and then RFID reader module. Then we will select the output pins that are to be connected to servo motor. Then we we will start programming the Arduino using Arduino IDE software. The some of the following example are present in library file. We will select the GSM module then the program will arrive the we'll do some modifications like feeding the number in module and the message to be transmitted whenever the card has been swipe. So after feeding the Program we'll compliance the program and upload it in Arduino using USB cable.

After powering up the circuit check the GSM module is well programmed then check the condition of led in GSM module. After this all setup is done. Check the circuit is working or not. So for checking it, we need to place the card on the Reader then save the data of user and deduct or credit the balance as per usages. After feeding the balance. The user has to place the card /tag on Reader then the balance gets deducted and the Arduino perform the action of and drive the servo motor and this servo motor will move the barricade up and down and open/close the barricade.

3) BLOCK DIAGRAM

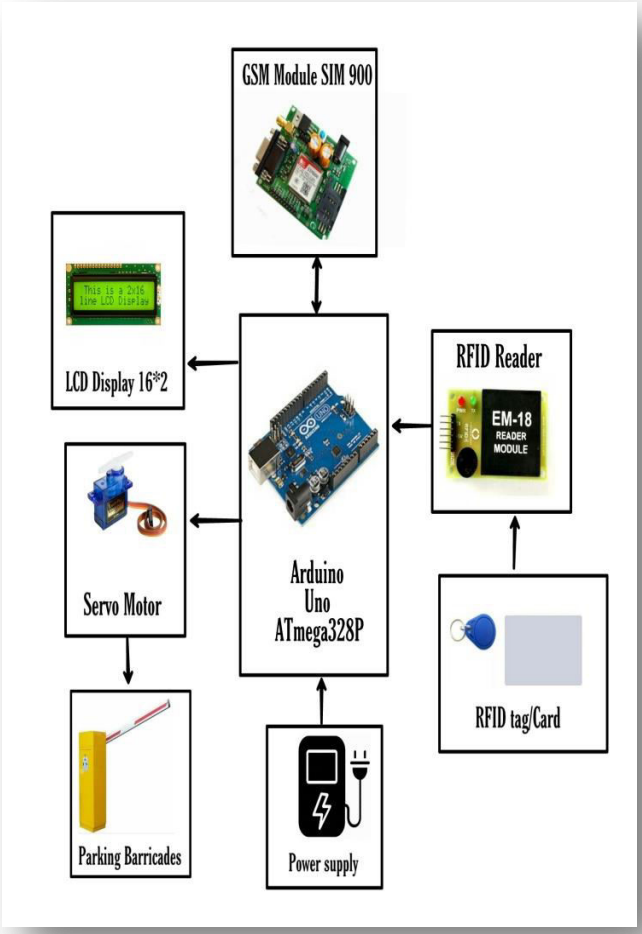

Fig.1. Block Diagram of Car Parking System using Arduino & RFID

a) GSM Sim900A Modem:

The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply.

b) Arduino UNO:

The Arduino UNO is the best board to get started with electronics and coding. If this is your first experience tinkering with the platform, the UNO is the most robust board you can start playing with. The UNO is the most used and documented board of the whole Arduino family.

c) Servo motor:

Servo motors have three terminals - power, ground, and signal. The power wire is typically red, and should be connected to the 5V pin on the Arduino. The ground wire is typically black or brown and should be connected to one terminal of ULN2003 IC (10 -16).

d) RFID Reader:

It is used to read unique ID from RFID tags. Whenever RFID tags comes in range, RFID reader reads its unique ID and transmits it serially to the microcontroller or PC. RFID reader has transceiver and an antenna mounted on it. It is mostly fixed in stationary position

e) LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display moduleused in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc.

4) WORKING

For the project shows the design of an RFID based car parking system using Arduino Uno for controlling, in this only authorized personnel with valid RFID card are allowed access to park and also the IN/OUT time details along with the fare are automatically calculated. When the circuit is switched ON, current time is displayed on the LCD display. When the ID card is detected by the reader, a unique card number is sent to the Arduino. If the card number is matched with saved number in Arduino or database, the Arduino will allow the car in order to park in the secured area. The entry time details of the particular card are stored in the Memory of Arduino. A welcome message along with the in time details are displayed on the LCD display and the same message will be send to the mobile no of user, the user mobile number is fed as per RFID card. And the Arduino will drive the servo motor, this motor will open & close the Barricade of Parking entry & Exit gate. When the same card is swiped again, the Arduino will display the in and out time along with the calculated fare details on the LCD and will transmit the same message to the user by means of SMS.

5) FLOW CHART FOR PROGRAM

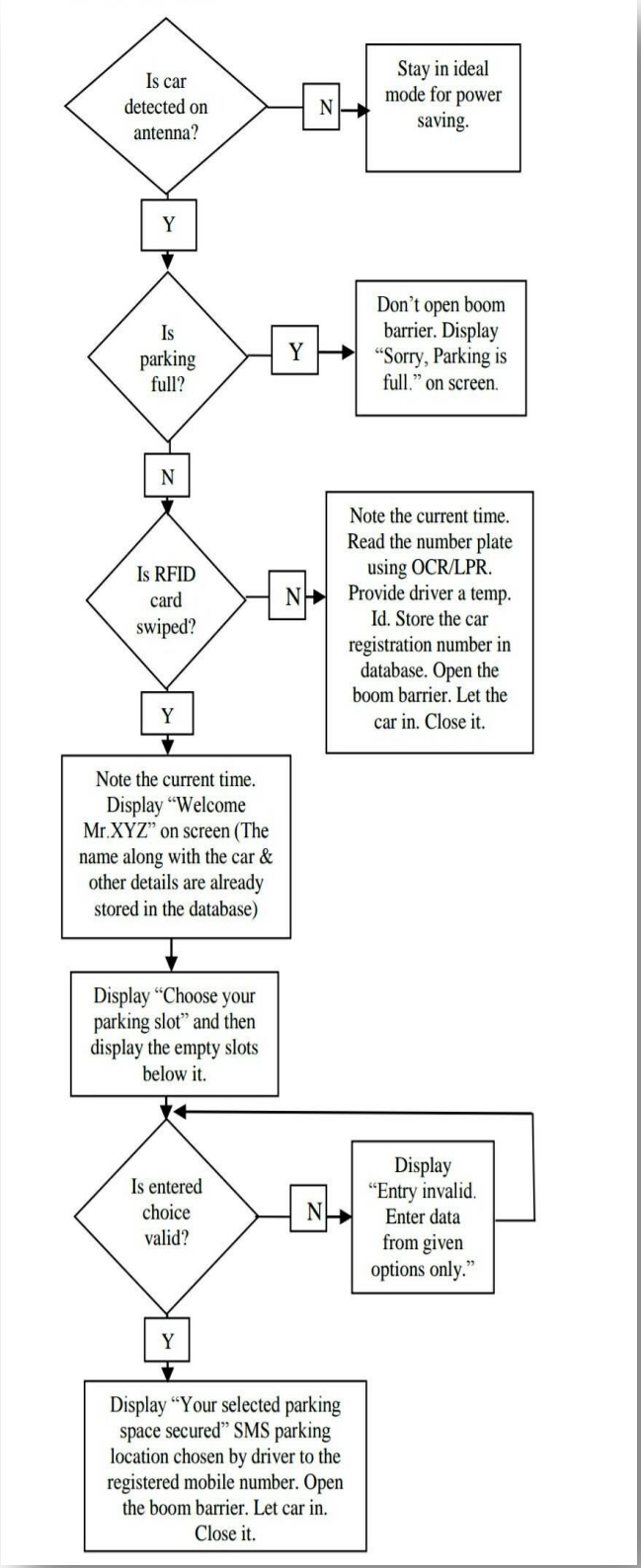

Fig.A. Flow chart programme for Entry of Vehicle

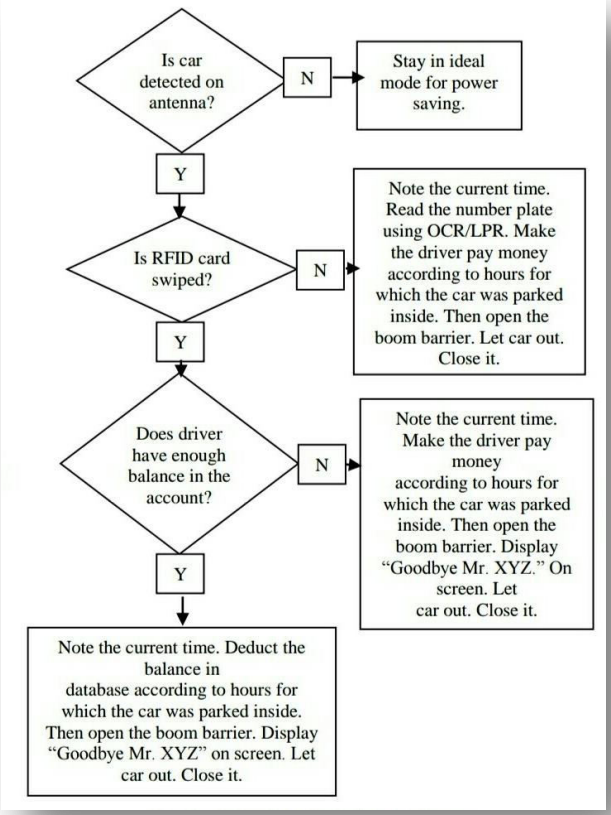

Fig.B. Flow chart programme for Exit of Vehicle

6) ADVANTAGES

1) **SAVINGS** RFID based Car Parking System is implemented in this project and can be used to eliminate the hassle of manual operation of parking system.

2) This system can help in reducing cost, increase in productivity and saves time.

3) Accurate timing details are measured with the help of RTC Module.

4) Prepaid and postpaid cards can be integrated with the system for easy payment options.

7) CONCLUSION

The paper focuses mainly on the changes, innovations and integration in RFID based parking management systems and on designing of a prototype of the proposed system in order that we will combine and use effectively several technologies just like the ones mentioned below RFID GSM The proposed system

suggests innovations like hour based money deduction, giving driver the selection of preferred parking slot at the entry and sending the SMS of driver's parking location to the registered mobile number. this technique can further be modified to book the parking slot through an app based system. the value analysis of the system which is proposed during this paper suggests that it's very cost-effective to be used even in small parking lots. Thus, the proposed system is in a position to require advantage of those 4 in-demand technologies and still it manages to be affordable to be used even by low-budget consumers.

8) REFERENCES

1) R.Ranjini1, D.Manivannan2, A Comparative Review on Car Parking Technologies presented at International Journal of Engineering and Technology (IJET).
2) http://www.u.arizona.edu/~obaca/rfid/history.html
3) http://www.idtechex.com/research/reports/rfid-forecasts-players-andopportunities-2016-2026-000451.asp
4) http://www.Circuitdesign.in
5) http://www.electronicshub.org
6) G. Arangurenss, L. Nozal, A. Blazquez, and J. Arias, "Remote control of sensors and actuators by GSM", IEEE 2002 28th Annual Conference of the Industrial Electronics Society IECON 02, vol. , 5-8 Nov. 2002,pp.2306 – 2310.
7) L. Schenker, "Pushbutton Calling with a Two- Group VoiceFrequency Code", The Bell System Technical Journal, 39(1), 1960, 235–255, ISSN 0005-8580.
8) P. Pradeep, M. Prabhakaran, B. Prakash, P. Arun Kumar, and G. Gopu, "Advanced Design for Robot in Mars Exploration," presented at 2010 International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, January 9 – 10, 2010.
9) T. Nguyen and L. G. Bushnell, "Feasibility Study of DTMF Communications for Robots," Dept of EE, University of Washington Seattle WA, 98195-2500, April 6, 2004
10) Yejun He and Minghai Chen, "2.45 GHz Broadband Monopole RFID Reader Antenna Buried in the Ground of Parking Lot near the Curb", IEEE International Conference on RFID Technology and Applications (RFID-TA), 2016
11) Petar ˇSoli´c, Ivan Marasovi´c, Maria Laura Stefanizzi, Luigi Patrono and Luca Mainetti, "RFID-based Efficient Method for Parking Slot Car Detection", 23rd IEEE International Conference on Software, Telecommunications and Computer Networks (SoftCOM), 2015
12) Chi-Lun MAK, Jingtian XI, "Low Profile Separable RFID Tag Antenna Design for Variable Range Applications", IEEE International Conference on RFID, 2016
13) Md. Mazidul Islam, Jinsong Song, Kimmo Rasilainen, and Ville Viikari, "Optimization of RFID Sensor with Frequency Modulation", IEEE Sensors Journal, Volume: 16, Issue: 15, Aug.1, 2016
14) M.Suresh, P.Saravana Kumar, Dr.T.V.P.Sundararajan, "IoT Based Airport Parking System", 2nd IEEE International Conference on Innovations in Information Embedded and Communication Systems
15) Asmita Jondhale, Gautami Das, Samadhan Sonavane, "OCR and RFID Enabled Vehicle Identification and Parking Allocation System", IEEE International Conference on Pervasive Computing (ICPC), 2015
16) Yadnesh Joshi, Pratik Gharate, ChetanAhire, Nikhil Alai, "Smart Parking Management System Using RFID and OCR", IEEE International Conference on Energy Systems and Applications, 2015