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RFID BASED AUTOMATIC CAR PARKING SYSTEM

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ABSTRACT - There has been a considerable amount of reduction in transaction costs and decrease in stock shortage with the use of Radio Frequency Identification (RFID) technology in automation. Most of the RFID networks include a wide range of automation technologies. These technologies are RFID readers, RFID writers, RFID barcode scanners, and RFID controllers. In this study, a solution has been provided for the problems encountered in parking-lot management systems via RFID technology. RFID readers, RFID labels, computers, barriers and software are used as for the main components of the RFID technology. The software has been handled for the management, controlling, and operation tasks for parking lots. Check-ins and check-outs of the parking-lots will be under control with RFID readers, labels and barriers.

I. INTRODUCTION

The increasing number of cars and the ever-decreasing amount of free space makes searching for parking place very difficult, especially in metropolitan areas. People rely on their car for transportation and need a practical and convenient place to park. This does not just apply to cities, urban areas and business parks, but also to office buildings, airports, train and subway stations, trade centers and hotels. Parking is increasingly becoming the deciding factor for companies who are looking to re-locate or build to suit.

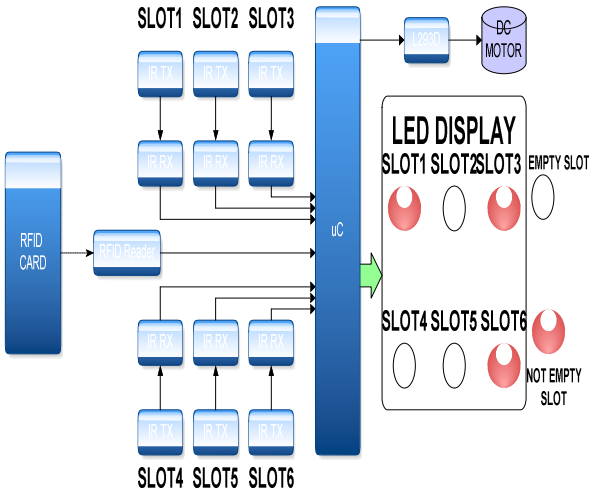
There are over 550 million cars on the road worldwide, and this number is increasing at a rate of more than 5% annually. As the number of drivers grows, so does the demand for convenient and safe parking. Automated parking, a method of automatically parking and retrieving cars, solves these and many other parking problems.

Literature survey:

As the present world using wireless technology, RFID (Radio Frequency Identification) which is one bringing a lot of changes in reducing the man power, Providing the security and controlling. This type of parking system is aimed to develop a parking system for an Organization or industry. Most of the RFID networks include a wide range of automation technologies. These technologies are RFID readers, RFID writers, RFID barcode scanners, RFID smart sensors and RFID controllers. Here we are developing a solution for the problems encountered in parking lot management systems via RFID technology. RFID readers, RFID tags and software are used as the main components of the RFID technology.

Typical applications can be in areas like:

1. Car Parking Management
2. Toll tax collection in bridges/highways
3. Car plate identification - Auto ID
4. Vehicle Rental lots
5. Surveillance



Block diagram of automated car parking using RFID

LCD DISPLAY : Liquid crystal display in this system is used to display status of modem, status of sensor and messages like number of parking slots free etc. led initialization in this system is done by using microcontroller and before initialization led has to wait for 30ms (delay).

RFID MODEM: RFID stands for Radio Frequency Identification. RFID is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects.

DC MOTOR: It is used for opening and rotating operations.

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MICROCONTROLLER (P89V51RD2): It is a low power, high performance 8-bit microcontroller and it performs all the activates like reservation, gate operation, cost calculation etc.

IR SENSORS: Infrared sensors in this system are present at gate to sense the presence of vehicle and aid the hardware to perform appropriate actions.

P89V51 Microcontroller:

Microcontroller is a computer on a single chip (IC), designed with all the in built facilities, both software and hardware, to control and /or monitor any device, process, equipment, machine, In general electronics, electrical, electro mechanical systems applicable to variety of industries.

P89V51RD2

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI.

Power Supply

Power supply required for the micro controller 89C51 is 5 volts. The LM78XX series of three terminal regulators is available with several fixed output voltages making them useful in a wide range of applications.

Initially a step down transformer is used to step down the input voltage to be given to the rectifier, which converts A.C voltage to D.C voltage.

Voltage Range

- LM7805C 5V
- LM7812C 12V
- LM7815C 15

Transformer:

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors the transformer's coils or "windings". Except for air-core transformers, the conductors are commonly wound around a single iron-rich core, or around separate but magnetically-coupled cores. A varying current in the first or "primary" winding creates a varying magnetic field in the core (or cores) of the transformer. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the "secondary" winding. This effect is called mutual induction.

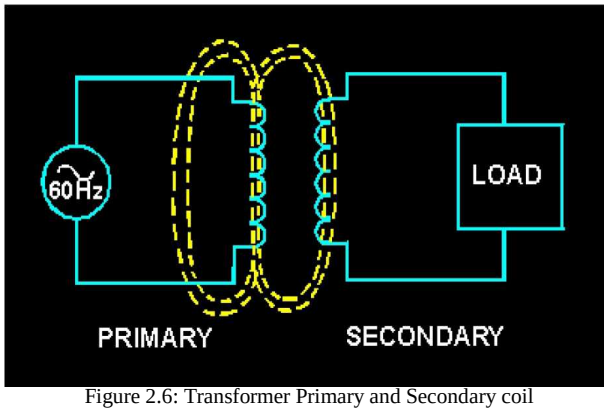

Figure 2.6: Transformer Primary and Secondary coil

Regulator IC (78XX)

Voltage Regulator (LM7805):

General description:

The LM78XX series of three terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

DC Motors

Almost every mechanical movement that we see around us is accomplished by an electric motor. Electric machines are a means of converting energy. Motors take electrical energy and produce mechanical energy. Electric motors are used to power hundreds of devices we use in everyday life.

Motors come in various sizes. Huge motors that can take loads of 1000's of Horsepower are typically used in the industry. Some examples of large motor applications include elevators, electric trains, hoists, and heavy metal rolling mills. Examples of small motor applications include motors used in automobiles, robots, hand power tools and food blenders. Micro-machines are electric machines with parts the size of red blood cells, and find many applications in medicine.

RFID

RFID stands for Radio Frequency Identification. RFID is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects. There are two main components: The Interrogator (RFID Reader) which transmits and receives the signal and the Transponder (tag) that is attached to the object. An RFID tag is composed of a miniscule microchip and antenna. RFID tags can be passive or active and come in a wide variety of sizes, shapes, and forms. Communication between the RFID Reader and tags occurs wirelessly and generally does not require a line of sight between the devices. An RFID Reader can read through most anything with the

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exception of conductive materials like water and metal, but with modifications and positioning, even these can be overcome.

There are many different types of RFID systems out in the market. They are categorized according to their frequency ranges. Some of the most commonly used RFID kits are as follows:

1) Low-frequency (30 KHz to 500 KHz)
2) Mid-Frequency (900KHz to 1500MHz)
3) High Frequency (2.4GHz to 2.5GHz)

II. COMPONENTS OF RFID SYSTEM

1. Antenna

The antenna emits radio signals to activate the tag and read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. Antennas are available in a variety of shapes and sizes; *they* can be built into a door frame to receive tag data from persons or things passing through the door, or mounted on an interstate tollbooth to monitor traffic passing by on a freeway.

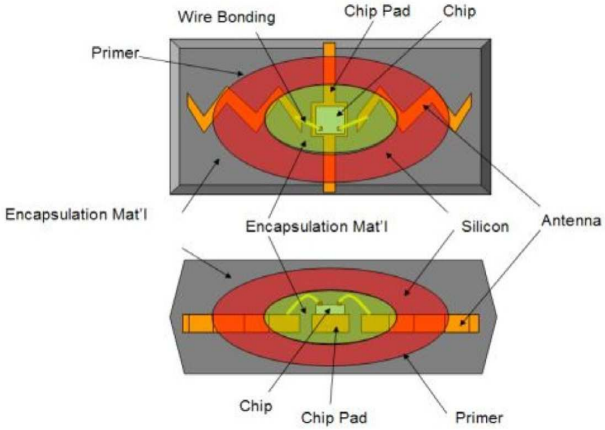

Figure : Antenna

TAGS (Transponders)

An RFID tag is comprised of a microchip containing identifying information and an antenna that transmits this data wirelessly to a reader. At its most basic, the chip will contain a serialized identifier, or license plate number, that uniquely identifies that item, similar to the way many bar codes are used today. A key difference, however is that RFID tags have a higher data capacity than their bar code counterparts.

RF Transceiver:

The RF transceiver is the source of the RF energy used to activate and power the passive RFID tags. The RF transceiver may be enclosed in the same cabinet as the reader or it may be a separate piece of equipment. When provided as a separate piece of equipment, the transceiver is commonly referred to as an RF module. The RF transceiver controls and modulates the radio frequencies that the antenna transmits and receives. The transceiver filters and amplifies the backscatter signal from a passive RFID tag.

IR Sensors

The solution proposed doesn't contain any special components, like photo-diode, photo-transistors, or IR receiver ICs, only a couple if IR leds, an Op amp, a transistor and a couple of resistors. I need, as the title says, a standard IR led is used for the purpose of direction.

LCD Display

A Liquid crystal display (LCD) is a low cost, low power device capable of displaying text and images. LCDs are extremely common in embedded systems, since such systems often do not have video monitors like those that come standard with desktop systems. LCDs can be found in numerous common devices like watches, fax and copy machines, and calculators.

LCD 16X2

Liquid crystal displays (LCDs) offer several advantages over traditional cathode-ray tube displays that make them ideal for several applications. Of course, LCDs are flat and they use only a fraction of the power required by cathode-ray tubes. They are easier to read and more pleasant to work with for long periods of time than most ordinary video monitors.

III. ADVANTAGES OF RFID OVER BAR CODING

a. No "line of sight" requirements: Bar code reads can sometimes be limited or problematic due to the need to have a direct "line of sight" between a scanner and a bar code. RFID tags can be read through materials without line of sight.

b. More automated reading: RFID tags can be read automatically when a tagged product comes past or near a reader, reducing the labor required to scan product and allowing more proactive, real-time tracking.

c. Improved read rates: RFID tags ultimately offer the promise of higher read rates than bar codes, especially in high-speed operations such as carton sortation.

Typical Applications for RFID

- Automatic Vehicle identification
- Inventory Management
- Work-in-Process
- Container/ Yard Management
- Document/ Jewellery tracking
- Patient Monitoring

IV. FUTURE SCOPE

Automated multistoried car parking system has a vast scope in the future because of the following reasons given for

demo we have used DC motor in future it can be implemented with hydraulic motor using which the car can be lifted quickly when compared to the DC motor. It can also be implemented with the rtc (Real time clock) which can be used for billing purpose. It keeps the record of the entry and exit time of the car. In order to increase the number of the number of slots higher version of microcontroller can be used. And infrared sensors can be used for each and every slot in order is to slot is free to park or it is full. Here to provide security we are using verification code scheme, in future it can be improved further.

V. CONCLUSION

This RFID car parking system will be useful to develop automated parking system which enroll the vehicle that pass through without the presence of the security officer, if there occurs any unauthorized access in car parking area, alarm will be enabled automatically by the system by checking the ID provide to the users and their cars. Hence the set up is simulated and tested for correctness. This type of parking system will be a boon to all departments.

REFERENCES

[1] Muhammad Ali Mazidi and Janice Gillispie Mazidi,"The micro controller and Embedded system",Pearson Education,2003
[2] "Electronics For You" magazine.
[3] E. Levin, R. Pieraccini, and A. Di Carlo, "User initiated and mixed initiative dialog for database information retrieval," in Automated Spoken Dialog Systems, S. LuperFoy, Ed: MIT Press, to be published.
[4] M. D. Sadek et al., "Cooperative spoken dialog system based on a rational agent model: A first implementation on the AGS application," in Proc. ESCA/ETR Workshop on Spoken Dialog Systems, Hanstholm, Denmark, 1995.
[5] D. Stallard, "The BBN ATIS4 Dialog System," in Proc. 1995 ARPA Spoken Language Systems TechnologyWorkshop, Austin, TX, Jan. 1995.
[6] L. P. Kaelbling, M. L. Littman, and A. W. Moore, "Reinforcement learning: A survey," J. Artif. Intell. Res., no. 4, pp. 237–285, May 1996.