Automatic Parking System for Vehicles

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Abstract- **This paper reports on Automated Parking slot. Automated Parking slot helps in the regulation of any parking slot with the large number of vehicle involved. This project concentrates on less manpower utilization, less installation and maintenance cost. This project is a versatile project which can be implemented on any condition and location. This is a conceptual project and just a prototype was designed and hence can go through the various stages of modification to make it reliable and much more suitable for the real time applications.**

Index Terms- Application of RFID, Automatic Car Parking, Automatic Parking System, Car Parking, RFID.

1. INTRODUCTION

As the automobile industry is growing day by day hence the large number of vehicles are produced and used by the common people. So as the number of vehicle increases it becomes much more complicated to regulate these vehicles. When they are to be parked hence we have designed this project to make the parking system much simpler and automated in order to provide automated parking slot.

This project can be implemented in various kinds of situation and places. Such as

schools, shopping malls etc. With less requirement of maintenance for better functionality of the parking slot. This slot has a various part such as entry gate, exit gate, vehicle.

2. LITERATURE REVIEW

Automated parking was infrequently built locally, although it did catch on in Asia; there are 1.6 million automated spaces recently in Japan. In the 1980s, one system built in Honolulu was a part of a small office construction on a crowded mixed-use street. Then, in the early 80‟s, automated parking solution were embraced by Japan and USA and spread to Australia, Southeast Asia, China, Philippines and Singapore. Between early 70‟s and late 80‟s, around more than hundred automated systems were built worldwide. In 20th century the automated parking can be used for multipurposes even though in short term it will come to life again to be implemented and managed by a swipe of card and by many other methods. It will be spread to solve many problems of parking issue and preserve the environments.

3. PROBLEM IDENTIFICATION

There were various paper published based on automatic parking slots, which used various type of sensors and others method for checking the number of car in the slot. Some of methods used were; Robotic Stall Monitor (RSM), which was used to monitor parking spaces within an enclosed parking structure and wirelessly transmit data to a system where parking attendants may inform clients of available spaces [1]. Automated Parking Lot Management System is a fully functional and digitally controlled parking lot management system that is implemented with the use and integration of different digital circuitry and micro computing [2]. Vision based car parking system in which there was camera mounted on a conveyor belt which was used to monitor the free space on the parking slot [3]. All above project were complex and used various equipment are costly. They were also a tough task to

install them and their trouble shooting was quite impossible. Hence in overall we can conclude that they were bit bulky, costlier, and tough to install.

4. PROPOSED SOLUTION

So for solving the problem, we are designing a project with following features

- We are designing a less complex system, thus the component required is also less.
- There will less man power involved for installation and operation
- As the design is simple it will be easier to maintain and troubleshoot the system.
- As the size of the system will be small hence it requires small space for installation and less power consumption.

5. COMPONENT USED

The main components of the automatic car parking system are:-

1. PIC Microcontroller
2. LCD Display
3. DC Motor
4. Power Supply Unit
5. Infrared Sensor

PIC Microcontroller:-

PIC Microcontroller is the heart of the automatic car parking system. It controls various operations of the system. Such as, It checks for the entry and exit of car, when it detects the car from the entry gate then it checks whether there is any vacant space in the parking lot or not. If there is vacant space then it operates the lift mechanism and parks the vehicle at the vacant space.

LCD Display Unit:-

LCD display makes this system user interface friendly by displaying everything on the display. It is an intelligent LCD module, as it has inbuilt controller which convert the alphabet and digit into its ASCII code and then display, this LCD will display the total number of cars ,empty space and no vacant space in the system.

DC Motor:-

The 12V DC motor is used to give reciprocating (up-down) and rotary motion to the lifting mechanism. Two DC motors are used for this purpose one is for lifting and carrying the car (up down motion) and other is for rotating the car.

Power Supply:

Power supply is required to run the whole system components i.e. microcontroller, DC motors, sensors, relays etc. In this system 5 volt regulated power supply is required for the microcontroller. For this purpose one step down transformer with full wave rectifier circuit is used. In the rectifier circuit two diode full wave rectifiers are used. One 1000 microfarad capacitor filter is used to convert pulsating dc into smooth dc.

Infrared sensor:-

An infrared sensor is an electronic device which is used to detect the vacant space Available in the parking system. And provide this information to the PIC microcontroller and indicator lights, so that the driver gets the information whether the parking space is available or not.

6. RESULTS

Case 1: A lift mechanism is used to park the car on the first floor which is implemented using motor. Motor is rotated clockwise it stops when it reaches on the first floor. The car is parked on the first floor successfully.

Case 2: The car which was parked on the first floor, was successfully retrieved & also the parking fee was collected successfully.

Case 3: A user tried retrieving a car which was never parked in actual or a wrong RFID card was swapped up, in both the cases, an error message was displayed on the LCD screen

Case 4: A user tried retrieving a car which but the parking fee was not paid by the user and in this case, an error message was displayed on the LCD screen and the car was not brought to the drive way.

7. CONCLUSION

This project is a versatile project which can be implemented at any location and condition with simple modification. This project is also helpful to

reduce the manpower and the total capital. Required for its installation and maintenance. This also reduces the congestion in the slot, as the numbers of vehicles are increasing day by day.

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