AUTOMATIC SMART CAR PARKING SYSTEM

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Abstract- This paper aims to provide a user friendly, reliable and automated car parking system Even if known; many vehicles may pursue very limited parking spaces to cause serious traffic congestion. In this paper, we design and implement a prototype of Smart Parking System The automatic car parking system is totally automated with the user being given a unique ID corresponding to the trolley being allocated to him or her this kind of equipment is useful to solve the issue of limited parking space available is busy cities. With the increase of economic behavior and the upgrade of living standard, the ratio of people in India who own automobiles and motorcycles have recently increased giving a boost to Metropolitan Traffic. Therefore, parking issues will be a big challenge to facilitate traffic network and ensure urban life quality. Searching for parking space in most metropolitan areas, especially during the rush hours, is difficult for drivers. The difficulty arises from not knowing where the available spaces may be at that time.

Keyword- design automation, load modeling, Mechanical parking system

I. INTRODUCTION

The traditional parking systems such as multilevel or multi-store car parking systems (non-automated), robot car parking systems, automated multilevel car parking systems etc. have been implemented on a huge scale. But these systems have a major disadvantage of large space consumption which is successfully eliminated with the use of "Automatic car parking system". In an automated car parking, the cars are left at the entrance and are further transported inside the building with mechanical structure. Similarly, they are retrieved by mechanical structure and placed at the exit for the owner to drive away. Our proposed system presents an Autonomous car parking that regulates the number of cars that can be parked in a given space at any given time based on the parking space availability. When a car arrives at the entrance, it will be stopped at the main gate and the driver de-boards the car. If the availability of Parking space is confirmed, the user commands the car to get parked to the designated slot. The car traces its path to the entrance of the parking area. Here, it waits and the details required for parking of car at the proper slot are communicated to the Car Control Unit. On receiving the information, the car will further trace its path To free parking spot. On successful parking, the data on the LCD will be updated automatically.

1.1 Project Objective
a) To develop an intelligent, user friendly automated car parking system which reduces the manpower and traffic congestion.
b) To offer safe and secure parking slots within limited area.

1.2 Parking Lot Problems
1.2.1 Difficulty in Finding Vacant Spaces Quickly finding a vacant space in a multilevel parking lot is difficult if not impossible, especially on weekends or public holidays.

Finding spaces during weekends or public holidays can take more than 10 minutes for about 66% of visitors. Stadiums or shopping malls are crowded at peak periods, and difficulty in finding vacant slots at these places is a major problem for customers. Insufficient car park spaces \ lead to traffic congestion and driver frustration.

1.2.2 Improper Parking
If a car is parked in such a way that it occupies two parking slots rather than one, this is called improper parking .Improper parking can happen when a driver is not careful about another driver's rights. This is tackled by the development of automated smart car parking system.

II. LITERATURE SURVEY

Various methods are prevalent for development of autonomous or intelligent parking systems. Study of these systems shows that these require a little or more human intervention for the functioning. One of the intelligent systems for car parking has been proposed by making use of Image processing. In this system, a brown rounded image on the parking slot is captured and processed to detect the free parking slot. The information about the currently available parking slots is displayed on the 7-segment display. Initially, the image of parking slots with brown-rounded image is taken. The image is segmented to create binary images. The noise is removed from this image and the object boundaries are traced. The image detection module determines which objects are round, by estimating each object's area and perimeter. Accordingly, the free parking space is allocated. A vision based car parking system is developed which uses two types of images (positive and negative) to detect free parking slot. In this method, the object classifier detects the required object within the input. Positive images contain the images of cars from various angles. Negative images do not contain any cars in them. The co-ordinates of parking lots

specified are used as input to detect the presence of cars in the region. Haar-like features are used for feature detection. However, limitations may occur with this system with respect to the type of camera used. Also, the co-ordinate system used selects specific parking locations and thus camera has to be at a fixed location. Limited set of positive and negative images may impose limitations on the system.

Number Plate Recognition technique for developing autonomous car parking system uses image processing basis to process the number plates of the vehicles. In this system, the image of the license number plate of the vehicle is acquired. It is further segmented to obtain individual characters in the number plate. Ultrasonic sensors are used to detect free parking slots. Then the images of number plate are taken and analysed. Simultaneously, the current timing is noted so as to calculate the parking fees. The LCD displays 'FULL' sign to indicate that a parking slot is not available. However some limitations with the system include background colour being compulsorily black and character colour white. Also, analysis is limited to number plates with just one row.

Smart Parking system designed proposed a mechanical model with an image processing facility. The car would be parked with the use of lift at multiple levels. Also, image processing is used to capture the number plate and store in database for comparison to avoid illegal car entry.

Thus, we aim to propose a car parking system that represents a fully automated model with minimum human intervention and overcome the limitations of existing systems.

III. METHODOLOGY

A. Description of block diagram

1. Consumer verification unit: The verification of the customer is done here; a smart card is given after the verification.
2. Keypad: password for security purpose.
3. Floor status indicator: It indicate the number of vacancies present or not.
4. LCD display: Display the welcome message.
5. Motor driver circuit: for driving motors.
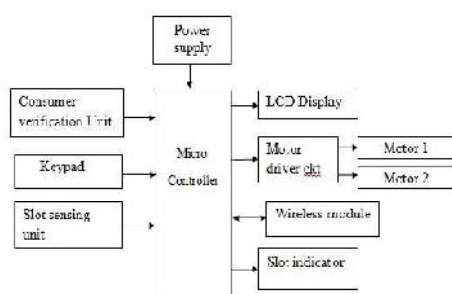6. Wireless Module: It is used for transmission purpose.
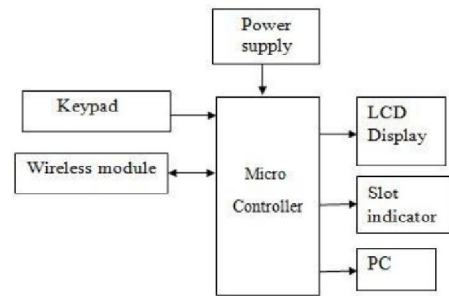

Figure 1.Parking Unit

Figure 2.Monitor Unit

B. Hardware Description
The hardware component required microcontroller, LCD, LDR, relay, DC motor, voltage regulator.

1) Microcontroller
The Microcontroller AT89S52 is a low-power, high-performance CMOS 8- bit microcontroller with 8K bytes of in-system programmable flash memory and data memory is 256 bytes RAM this chip is manufactured using Atmel's high-density non-volatile memory technology and it is compatible with the industry- standard 80S52 instruction set and pin out. The on-chip flash memory allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer.

2) Relay
It is used for auto switching device.

3) RFID Tag/Reader:
RFID Identification. An RFID system consists of two parts .i.e., a reader, and one or more transponders, which are also known as tags. RFID systems have evolved from barcode labels as a means to automatically identify and track products as well as people. In this system, the user is assigned a unique ID corresponding to the specific trolley. This helps in quick identification and movement of the same

C. Software Description
Proteus 8 is the best simulation software for various design with microcontroller.it is mainly popular because of availability of almost all microcontroller in it. So it is a handy tool to test programmes and embedded designs for electronic people. Simulation can be done using proteus 8 software.

IV. ADVANTAGES

1. It ensures quick and automated parking and easy retrieval of vehicles.
2. Up to 6 cars can be easily and safely parked in the designed model.
3. The surface space required is equivalent to the parking space of two cars only.
4. Most suitable for parking in offices, malls and similar places.
5. Low maintenance levels are required by the system.

6. Sensors used have high sensitivity and are easy to handle.
7. Low cost system, providing maximum automation.
8. It does not require line-of-sight operation.
9. Friendly reorientation of cars for driving in and out.
10. Safety of vehicle.

CONCLUSION

Analysis of the model has to be done while developing a life size model. The mechanical model has been designed and the software as well as the control circuit has been implemented successfully. It demonstrates the working of the planned automated smart parking system. The main advantages are space optimization, cost effectiveness and security.

FUTURE ENHANCEMENT

In future works, this system can be improved by adding other applications such as online booking by using gsm. The driver or user can book their parking lot at home or on the way to the shopping mall. This can reduce the time of the user to searching the vacant parking lot.
As a further study, different sensor systems can be added to improve this system to detect the object and guide the driver or users fastest. We will try to reduce the mechanical structure and try to make it ecofriendly.

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