

Automated Ticketing of Vehicle Parking System Based on Embedded

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ABSTRACT

Moving towards the development of smart city, various smart applications like smart home, healthcare, street lighting, parking system, waste management system etc. It can increase the quality of services in cities and can improve productivity and reliability. Out of these applications smart parking systems are an important part of it called smart cities. It solves the parking issue in urban areas and also avoid the roadside parking. Smart parking system allows the user quick access which helps in reduction of time in searching the parking spot, reduction in traffic congestion. It can be used to manage and regulates the parking systems and exhibit the parking lot at any given moment..

Keyword- Arduino uno ,automated ticketing for parking.

I. INTRODUCTION

Our project presents a miniature type of automated ticketing of vehicle parking. The aim of this project is to automate the vehicle park for allowing the vehicle into the parking. LCD is provided to display the information about the details of parking slot and the place free for parking. When a vehicle arrives at the entrance, it will stopped the vehicle while slots are available or not.

The main objective of this project is to use arduino to implement a smart parking system in order to reduce the problems such as reduction in the traffic congestion at heavily occupied locations .the prime objectives of this project reduce pollution generated by vehicle in traffic .to check unauthorized use of parking space as well as loot of vehicle .provides the

user- friendly environment to park a vehicle. reduces the stress and pollution while searching for the parking space. consume fuel while searching for parking and save the time.

The Arduino UNO is a widely used open-source microcontroller The Arduino UNO board has six analog input pins A0 through A5. These pins can read the signal from an analog and convert it into a digital value that can be read by the microprocessor. The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output pins to drive different modules like LEDs, relays, etc. The pins labeled ~ can be used to generate PWM. The crystal oscillator helps Arduino in dealing with time issues.

The Arduino crystal is 16.000H9H. It tells us that the frequency is 16,000,000 Hertz or 16MHzs Servo motor-The tower Pro SG90 9g Mini Servo is a 180° rotation servo. It is a Digital Servo Motor which receives and processes PWM signals faster and better. In this system a servo motor is used at the entrance and exit to open the gate. It is operated by the digital signals sent from arduino.

IR sensor- IR sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. In this system IR sensor is used to detect the vehicle at the entrance, exit and at the parking.

LCD display- LCD (Liquid Crystal Display) screen is an electronic display module and finds a wide range of applications. A 16×2 LCD display is a very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. In this system LCD display is used to provide the information about the number of parking spaces occupied or free

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.

In the 1920s, forerunners of automated parking systems appeared in U.S.A cities like Los Angeles, Chicago, New York and Cincinnati. Some of these multi-storey structures are still standing, and have been adapted for new uses. One of the Kent Automatic Parking Garages in New York (now known as the Sofia Apartments) is an Art Deco landmark that was converted into luxury condominiums in 1983. A system that is now found all over Japan — the “Ferris-wheel,” or paternoster

system — was created by the Westinghouse Corporation in 1923 and subsequently built in 1932 on Chicago’s Monroe Street.

The Nash Motor Company created the first glass enclosed version of this system for the Chicago Century of Progress Exhibition in 1933, and it was the precursor to a more recent version, the Smart Car Towers in Europe Automated (car) parking system APS saw a spurt of interest in the U.S. in the late 1940s and 1950s with the Bowser, Pigeon Hole and Roto Park systems. In 1957, 74 Bowser, Pigeon Hole systems were installed, and some of these systems remain in operation. However, interest in APS in the U.S. waned due to frequent mechanical problems and long waiting times for patrons to retrieve their cars. Interest in APS in the U.S. was renewed in the 1990s, and there are 25 major current and planned APS projects (representing nearly 6,000 parking spaces) in 2012.

While interest in the APS in the U.S. languished until the 1990s, Europe, Asia and Central America had been installing more technically advanced APS since the 1970s. In the early 1990s, nearly 40,000 parking spaces were being built annually using the paternoster APS in Japan. In 2012, there were an estimated 1.6 million APS parking spaces in Japan. The ever-increasing scarcity of available urban land (urbanization) and increase of the number of cars in use (motorization) have combined with sustainability and other quality-of-life issues to renew interest in APS as alternatives to multi-story parking garages, on-street parking and parking lots Number Plate Recognition technique

[3] 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 the

number plate are taken and analyzed. Simultaneously, the current timing is noted so as to calculate the parking fees. The LCD displays a 'FULL' sign to indicate that a parking slot is not available. However some limitations with the system include background color being compulsorily black and character color white. Also, analysis is limited to number plates with just one row. Smart Parking system [4] 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 a database for comparison to avoid illegal car entry. Thus, we aim to design a car parking system that represents a fully automated model with minimum human intervention and overcome the limitations of previous systems.

III. PROPOSED OF WORK

In this paper, we present the proposed architecture of our system. We aim to develop an autonomous car parking system using arduino uno and thus aim to provide an efficient car parking system.

A. Interfacing LCD with Microcontroller

Interfacing of microcontrollers with LCD Unit is mainly used for displaying the parking slot status data to the system user. The LCD module can represent data in alpha-numeric data along with some predefined characters. The LCD module communicates with the micro-controller and displays the number of free slots to the user.

B. Entry and exit gate

There will be two gates (entry and exit) which will be operated automatically with the help of sensors such as Proximity, weight sensors, depending upon the location of the application. As soon as the vehicle reaches the entry gate, it will be sensed by the sensors and the signal from the sensors will simulate the controller to operate the gate. Now when the

vehicle is sensed at the exit gate the same phenomena will occur.

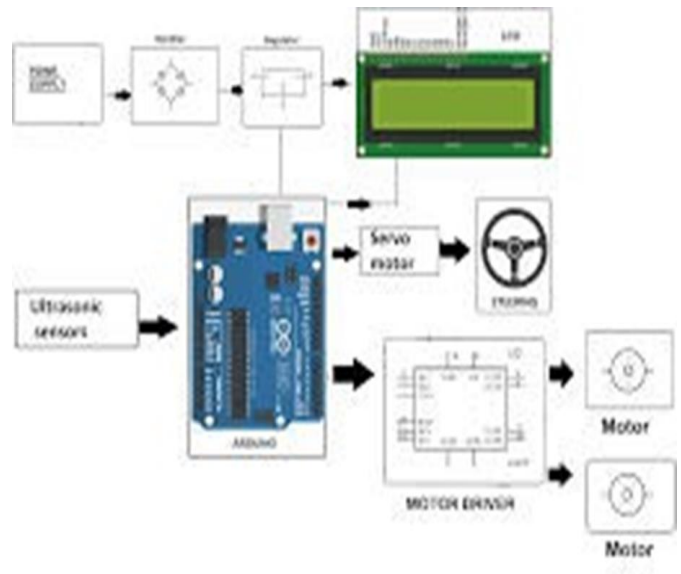


figure a. Interfacing LCD with arduino uno

C. Secure parking

By using a servo motor and IR sensor the gate will be open automatically. a person will park the vehicle, and enter the password for security purposes. Then vehicles are secure and no one can loot the vehicles



Figure b. secure parking.

IV. MATHEMATICAL CALCULATION

Money Estimation For Two Wheeler

One hour = Rs 10

1 min = Rs 10/60 = 0.16

1 sec = Rs 0.16/60 = 0.0026

parking time = Millis (p) Leaving time = Millis (L)

Estimated amount = (L - P) X 0.0026

Money Estimation For Four Wheeler

One hour = Rs 20

1 min = Rs 20/60 = 0.33

1 sec = Rs 0.33/60 = 0.0055

parking time = Millis (p)

Leaving time = Millis (L)

Estimated amount = (L - P) X 0.0055

V. EXPECTED OUTPUT

A proposed system on Autonomous Car parking commanded by an Android application has been discussed in this paper. The result expected from successful implementation of the system is an efficient car parking and retrieval method. The successful implementation of system consists of allotment of free parking slot to the car and a proper path-tracing to the slot. Also data on the LCD display is updated as per allotment and de-allotment. If the parking space is full, no car is allowed to enter the parking space until any of the parking slots is made available.

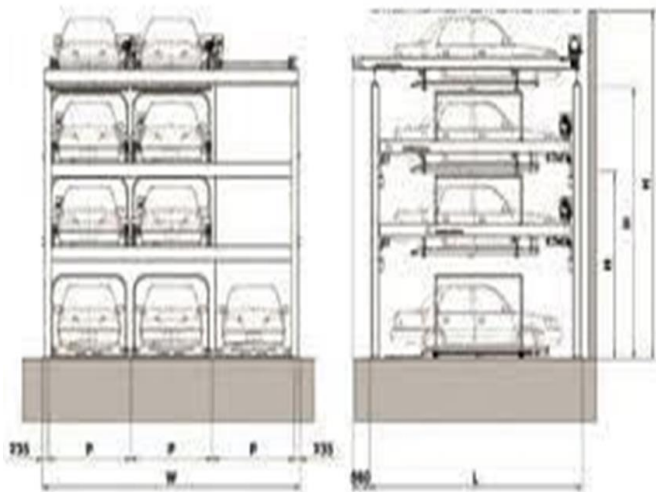


figure c. Expected output

VI. CONCLUSION

This proposed system, we can find-out the free slot in the parking area and it can also be used for security systems. This can be implemented in a real-time

environment and the corresponding data can be computed and displayed on the web page or mobile application. This system can reduce the manpower radiating an effective solution for the real-time problem. Thus, this design finds its applications in many cases. The system has satisfactorily fulfilled the basic things such as finding a free parking slot in the parking area inside the mall. But still, the power supply for the processor and sensors has been powered ON for the full time. In future enhancement, the vehicle number and its type will be scanned by using

VII. REFERENCES

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