



INTELLIGENT CAR PARKING SYSTEM

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Abstract:

Nowadays parking has become a serious issue because of the increasing number of vehicles everywhere. In this project we done, online register for user to monitor and book the parking slot for the cars it provides an intelligent solution. The main aims to reduce difficulties in parking system. From RFID technology it is easy to find the car information, and image processing is used to detect the free parking slots and LCD display shows the number of available parking slots.

INTRODUCTION

In urban area, we are having so many problems for car parking i.e. In metropolitan and all other big cities, and also to be developed towns/cities car parking is very difficult to park anywhere especially in Market area, shopping malls, Theaters and Offices etc. The lack of implementation of technology which are available in the market today is the main reason of this problems. In most of all to be developed cities having narrow roads it is very difficult to parking. When the drivers/customer keep on searching for parking area they waste their time, fuel consumption and increases carbon emissions for parking the car because of the destination is unknown. In the present situation we are seeing excess of vehicles and ineffectiveness to manage them. Nowadays parking has become a serious issue and even worsen because of the increased number of vehicles, but still a major problem with increasing vehicle size in the luxurious segment and also confines parking spaces in urban cities. The rapid growth in the number of vehicles

worldwide is intensifying the problem of the lack of parking space. As the global population continues to urbanize, without a well-planned, convenience-driven retreat from the car, these problems will worsen in many countries. The current unmanaged car parks and transportation facilities make it difficult to accommodate the increasing number of vehicles in a proper, convenient manner so it is necessary to have an efficient and smart parking system. Intelligent Parking management systems are capable of providing extreme level of convenience to the drivers The most of traffic occurs only because of vehicles congestion in the urban areas thus people are wasting time in searching the parking area abnormally to park their cars and one more issue is also added to this pollution, which effects the entire environment due to increase in vehicles.

PROBLEM STATEMENT

There is no proper selection of vehicle according to the parking space, The drivers usually waste time and efforts in finding parking slots and end up in parking their cars finding a space on sheets.



RELATED WORK

Saba Latif has focused on intelligent traffic monitoring system using graph theory and formal methods. Our proposed model has various nodes that are assumed within a city including roads, objects and traffic signals to make a collective intelligent traffic guidance and monitoring system.

Smart city is implemented through smart node in real scenarios to make digital environment in all field of smart parking.^[1]

Wenyucai, dong zhang, yongjie pan has proposed a designed parking guidance system based on parking sensor network. The system consists of parking sink nodes and parking manager.

The system builds the parking sensor network by Zigbee communication protocol, where the real-time parking information of all parking sensors is transmitted to sink node. This sink node sends information of all parking slots to the parking manager by manner. In, the parking manager there will display the information and position of parking space. Moreover, this paper uses Dijkstra optimization algorithm to obtain optimal parking router.^[2]

Gul shahzad has proposed a smart energy efficient parking system, which integrates the image recognition for license plate recognition, infrared sensor for group control and WSN for intelligent LED lighting.

The system is built on ZigBee base wireless mesh network (WMN) nodes equipped with image sensor and RF module. The proposed system presents the substantial amount of energy savings, less environmental pollution.^[3]

Ming wang has proposed, a parking system is of great significance for an intelligent transportation in smart cities. This paper presents a novel parking system designed for smart cities with the technology IOT. The parking system adopts a framework of Iot and cloud computing. The paper presents a parking guidance function method with an improved ant colony algorithm is effective. Moreover, the paper also illustrates the main functions and to design human machine interfaces of the parking system.^[4]

Talha kilich has proposed, to provide a framework that can instantly communicate park information to customers in different parts of the city. For this, parking information is stored in a database using cloud architecture through

the sensors in the parking information stored in the database with an improved application. With smart parking system, it is possible to find suitable parking place, to prevent loss of customer's time and to reduce costs. The smart city structure aims to combine data from different sources to different purposes under a single point.^[5]

PROPOSED SYSTEM

1. Web portal is provided to allow the user to check the availability of the free parking slots.
2. Image Processing based empty slot detection.
3. Radio frequency identification technology is used to identify the car formation.
4. When the car is entered in the parking space number plate is recognized.

OBJECTIVES

Main objectives in an Intelligent Car Parking System are:

- (1) To create simple web portal.
- (2) Easy payment system.
- (3) To book a parking slot from home through online.
- (4) To search nearby places using google maps.
- (5) To send a alert message in SMS.

HARDWARE AND SOFTWARE REQUIREMENTS

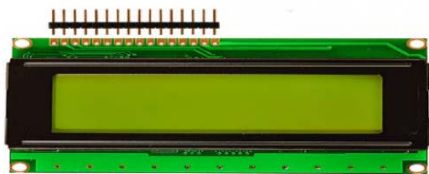
Hardware Requirements:

1. Arduino



Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world.

2. LCD display



(Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation

3. IR Sensors



An infrared sensor is a 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 detect the motion.

4. Motor



Motor is the electro-mechanical machine which converts the electrical energy into mechanical energy. the devices which produce rotational force is known as the motor

5. Power Supply



A power supply is a hardware component that supplies power to an electrical device. It receives power from an electrical outlet and converts the current from AC (alternating current) to DC (direct current), which is what the computer requires.

6. RFID Reader



A Radio Frequency identification reader is a radio frequency device that emits a signal through an antenna. This signal is received by RFID tags that respond to interrogation by the reader.

7. Motor drivers



They are basically current amplifiers which accept the low current signal from the controller and convert it into a high current signal which helps to drive the motor.

Software Requirements:

1. Python



Executive Summary. Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built-in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting

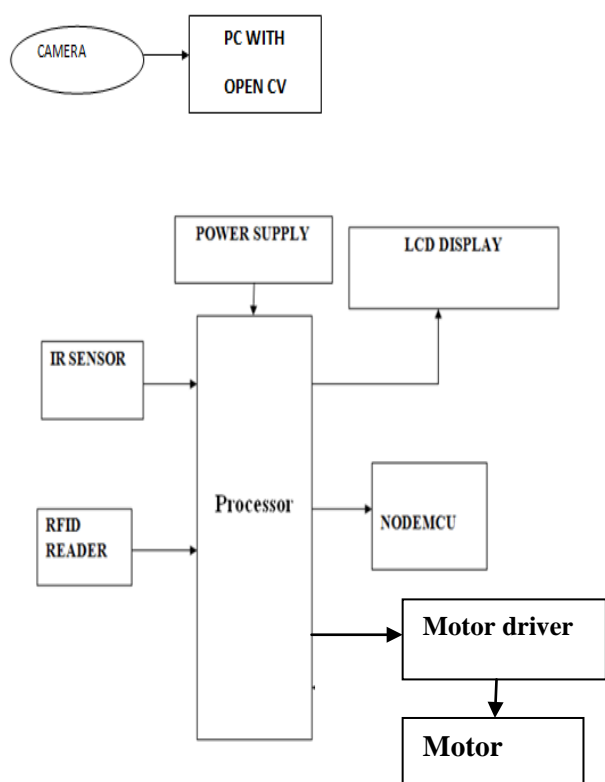
2. Open CV



Open CV stands for open-source computer vision. It was generated to support a common infrastructure for computer vision operations and use system behavior in financial products. It generally targets image processing, faces recognition, video capture, searching, and object disclosure

SYSTEM DESIGN

System design supplements the system architecture by providing information and data necessary for implementation of the system elements. It allocates the requirement of a system to hardware and software components.

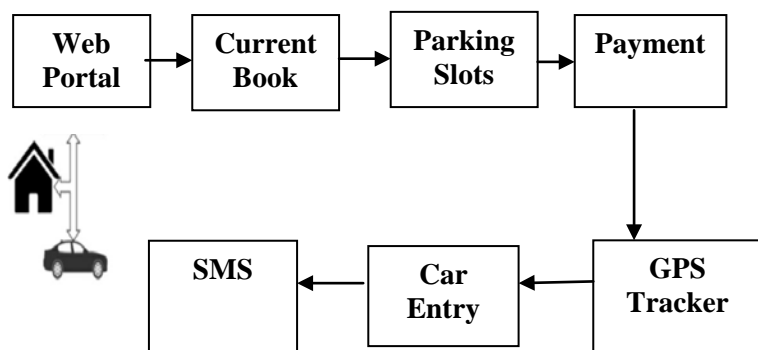


1. Processor is a central processing unit and it connects the all devices.
2. IR sensor is used to the opening and closing the parking gates and also for alarm buzzer. RFID reader is used to give the information of car. Power Supply is used to supply the electric power to all the devices.
3. LCDdisplay, it display the number of availability free parking slots.
4. NODEMCU is an opensource firmware and development board targeted for iot

based applications that relies on the ESP8266 wi-fi.

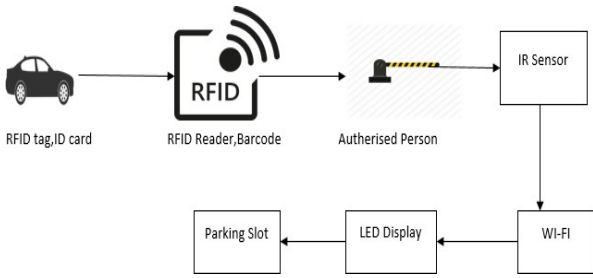
5. DC motors are used to open the parking gates when the authorized user enters then check-in and check-out timings are stored and unauthorized user doesn't allow the parking area.
6. Pc with OpenCV in personal computer we will install the software of OpenCV. OpenCV is a great tool for image processing. In image processing module the system initialization and image detection will described.
7. Camera catches the number plate of the car and update the information in database.

SYSTEM ARCHITECTURE



1. We tend to produce a straightforward internet portal like robot app or internet sitesvictimization web development. From this internet portal we will simply do on-line registration and reserve our parking slots.
2. Oncewe book a parking area it's straightforward to pay quantity through on-line payment systems.
3. From GPS hunter it's easy to hunt out the locations
4. He approved vary plate is allowed to parking slot.
5. GSM is a digitalized mobile network and tiny controller.It is used in sending the SMS,MMS,Voice messages.

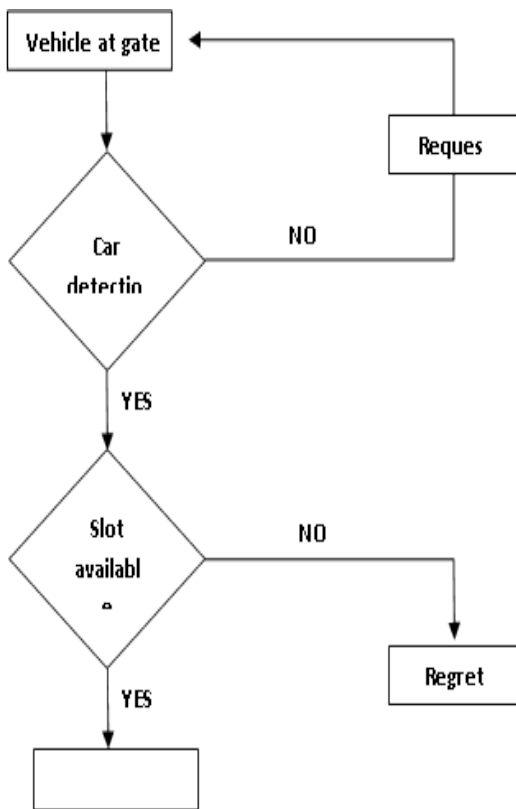
Architecture of Deducting Empty Parking area/space



For every parking space, Infra-Red (IR) sensors are implemented and IR sensors are used to identify vacant parking space. Number of vacant and booked slots are visually displayed in LCD screen. WIFI module is used for communication between mobile app and sensors. Figure shows a detecting of empty parking slot and communicating used Wi-Fi to Arduino.

FLOWCHART

A flowchart is a type of diagram that depicts a workflow or process. It shows the separate steps of process in sequential order.



METHODOLOGY

Online Registration:

In urban areas finding automobile parking space is troublesome in rush hours. thus here we tend to developed on-line booking system by victimization this we will book the parking slots before like moving picture tickets, looking malls, perform Halls, etc. booking on-line. we will book the parking slots by employing a mobile app or internet portal. info provides parking availableness information; if there are any vacant slots accessible then we will book the interested slot and complete the payments. once we finished booking, the info is updated with current availableness.

Image Classification:

Neural networks are wont to upset the options and patterns. NN involves the detection of object (vehicles) through the classification of options from associate unknown input pattern by scrutiny it to already provided learned patterns. It detects Vehicle and vacancy house by scrutiny the reference pictures. The reference pictures are keep within the info and also the network is trained to run with the assistance of the keep pictures. Therefore, the NN classifier compares and evaluates the input pictures therewith of the reference pictures within the info and determines the required output. The detection method is disbursed and also the output is simulated within the Open CV platform. Desired outputs are obtained for the method of car detection and vacancy in parking lot. The output for the designed system proves sensible for all the attainable mixtures within the parking model.

Security module:

In Security module, Entry and Exit gate are opened provided that approved range plate is recognized. Unauthorized person won't be allowed to park in automobile parking space. If free automobile parking space won't be accessible, then gate won't be opened although approved card is shown. info is maintained to ascertain WHO is coming into and departure the parking lot and arrival and check-out timings of them. Overall system can permit to track the user's details and has temporary security system by not permitting unauthorized persons to enter into parking premises.

Entry:

When the user reaches parking gate, range plate is recognized. If it's approved, then signal are

send to servo motor to open gate and arrival time has been kept within the info. Once the automobile gets entry, gate are closed. If the user is allowed and free automobile parking space isn't accessible, then Arduino can send signal to show that parking isn't free and thus gate won't be opened. If the user is unauthorized excluding Raspberry Pi can send it to show unit to indicate the UNAUTHORIZED message and cannot permit to open the gate.



CONCLUSION

In this paper we are presenting to plan and integrate with another software applications to help drivers to find the empty slots to park the car more easily with less time. Also we are implementing the sensors like IR sensors to opening and closing the gates and GPS (global positioning system) is used to tracking the

location. Developing an Intelligent Car Parking solution with in a city solve the pollution problem.

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