Smart Parking System using techniques of Javabeans along with database and Java

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Abstract—
In this age, when we have well-connected roads, commercial building and increasing number of vehicles, parking is still a matter of concern. Still we are using manual procedure of parking. Because of this, a huge traffic jam takes place. While parking and retrieving it out, vehicles suffer dent by bumping with each other as there is lack of sufficient space. Keeping this chaos in mind, we are introducing automated parking systems as a solution of these problems. In addition, existing parking system in commercial spaces is creating hurdle and causing wastage of time and economical losses as well. This Smart Parking System is a solution of all these problems as well as replacement to the manual parking system. The aim of this paper is to presents a miniature model of an automated parking system that can regulate and manage the number of vehicles that can be parked in a given space at any given time based on the availability of parking slot.

Keywords—automated,smart,parking,Iot,Javabeans

I. INTRODUCTION

Problems with the Traditional car parking system:
Traditional or manual car parking system is everywhere in our country but this system is full of problems. They are: We can see in many shopping malls, hospitals huge traffic jam in front of the parking. The parking guard stops the entire vehicle and gives a payment slip, this creates traffic jam. It is difficult and time consuming to find out the parking slot which costs extra fuel and wastes time. Security problem is one another problem in manual car parking, people can enter in parking slot and there snatching, robbery can happen. In manual parking system some guard needs to be appointed for whole job, it is costly enough.
Advantages of automated vehicle system:
Reducing traffic jam, Automated vehicle system reduce the traffic jam because here we are using a card system for paying the money, punching the card in the payment booth and e tray will place the vehicle in required place. Secondly, it will save a lot of time due to automated parking and people will not be late to their important meetings. Safety is also assured in this system. Here no people can enter in the parking so that there is no chance of snatching, robbery, stealing, sometimes in silent parking space peoples are being harassed. In this system we are using an automatic tray which will take the vehicle into the parking space and place it in required slot. This will reduce the fuel cost. . Lastly, it will save operating cost since the parking charge collecting cost is reduced. There is reduction in the man-hour required as the system does not require any human interaction for the money transaction.

II. LITERATURE REVIEW:

Smart parking reservation system using short message services(SMS) which was introduced by Noor HazrinHanyMoham adHanif (2009) had the Enhanced security due to password requirement and System can be used and applied anywhere due to ease of usage easily. But due to high Cost of implementation feature creates bottlenecks. The microcontroller will have to take a lot of load which can crash the system.

ZigBee and GSM based secure vehicle parking management and reservation system by P.S Ramesh (2012) with featured Parking lot vacancy module uses ZigBee along with PIC and Security Feature: The exit password must be entered else the user is not allowed to get out of the parking bay as the barrier gate will not get open until correct exit password is entered.

Smart Parking Service based on Wireless Sensor Networks by Jihoon Yang (2012) provides use of android application provides ease of usage and better interface. GPS helps in max coverage of available area, displaying various options for parking Reservation feature is not available for the user. Multilevel parking inside an infrastructure is not available.

An Intelligent Parking Guidance and Information System by using image processing technique by authors P.Dharma Reddy ,A. Rajeshwar Rao ,Dr. Syed Musthak Ahmed (2013).By using image processing technique it identifies car only but if any object other than car is at parking slot it doesn't considered that slot is booked. Shows real time information. High cost of implementation. User will have to inquire for every slot available. GSM system creates bottlenecks.

Wireless Sensor Network and RFID for Smart Parking System By Manjusha Patil ,Vasant N. Bhonge(2013).It provides information of the slot available as well as guides the driver to the particular spot. There is no need to change the existing parking system and it is compatible with the existing wired networks. Reservation of available slot is not provided. Use of RFID increases the cost and Node-to-node implementation requires more time.

New "Smart Parking" System Based on Resource Allocation and Reservations by Yanfeng Geng, Christos G. Cassandras (2013) Reservation of the desired parking slot is available. Efficient resource allocation and management using MILP. A parking spot is reserved by a driver, but it is occupied by a different driver. A parking spot is reserved by a driver. The driver parks his vehicle but forgets to confirm. The system requests confirmation and until the driver says YES.

Intelligent Parking Management System Based on Image Processing.Hilal Al-Kharusi, Ibrahim AlBahadly (2014).The system captures and processes the rounded image drawn at parking lot and produces the information of the empty car parking spaces. A camera is used as a sensor to take photos to show the occupancy of car parks. Single camera can detect the presence of many cars at once. The weather conditions affect the System i.e. in terms of visibility. The camera should be in a position where it can see all the car parks and not be obstructed by any objects. The main disadvantage is that no guidance is provided to the parking lot.

Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition by M. M. Rashid,A. Musa ,M. AtaurRahman ,N. Farahana (2014)The auto parking system will have less interaction of humans and use magnetic card and its devices. License plate recognition applies image processing and character recognition technology

to identify vehicles by automatically reading the license and its used for billing. Number plate is differed in term of color, size and type from country to country. Different algorithm has to be applied for different type of number plates. No way can a user reserve a parking lot in advance.

Automated Parking System with Bluetooth access by Harmeet Singh, Chetan Anand,Vinay Kumar ,Ankit Sharma (2014) .The system uses the user mobile's Bluetooth for identification and registration. The vehicle is transported to the parking location with the help of a rack and pinion mechanism for linear motion. It automatically detects the unique registration number stored in the Bluetooth chip to check if the new vehicle is to be parked. Cannot be used in existing parking system. The whole parking lot is to be designed with mechanical components such as rack and pinion mechanism

Car Park Management with Networked Wireless Sensors and Active RFID. ElMouatezbillah Karbab, Djamel Djenouri,Sahar Boulkaboul ,Antoine Bagula (2015). The main advantage of the gate management model is its low cost and simplicity over lot management model. Gate management service: Another use of RFID tags is gate management. As example, a gate can be opened automatically using an RFID reader and the vehicle's tag at the gate plus there is no driver guidance systems to guide towards the parking lot.

Parking Guidance System Utilizing Wireless Sensor Network and Ultrasonic sensor by K.W Fong which introduces a system which implements shortest path algorithm to calculate the short distance from the parking berth to the nearest preferred entrance.

Smart Parking System with Image Processing
Facility by M.O. Reza, M.F. Ismail introduces a prototype of the parking assistance system based on the proposed architecture was constructed here. The adopted hardware, software, and implementation solutions in this prototype construction are described in this paper. Cost of implementation was high and there will be too much load on the processor.

III. DESCRIPTION

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. The project **"IOT based Smart Parking system"** was designed such that the status of parking slots can be known from anywhere in the users webpage.

To have a proper knowledge about the hardware components as well as the software components of the project is a must. Arduino Uno played a vital part in our project as it contains all the software data in it. To send the confirmation message to the user we've used GSM module. We used DC motor to open gate and move the tray wheel. The software components and the hardware component working synchronously will provide best environment of Automated Vehicle Parking. The overall scope of the automated parking is to provide sufficient information to allow to make a decision to weather vehicle parking system proceed and if so, it's relative priority in the context of other vehicle parking system. The construction of this project has undergone through various steps which is described below,

-identify the origin of information at different levels.

-identify the expectation of the user from the computerized system. And analyze the drawback of the existing system of the other research papers that were published.

Requirement of the automated systems is the correct form of data and all the data entered should be correct and up to date .This software package is developed using Java as the front end which is supported by the sun micro system. Microsoft sql server as the back end. Underneath is a description of the software and hardware components that will be used in the system.

Hardware interface-
Operating System-Windows
Hard Disk-160GB
Ram-512 MB
Processor-Pentium dual core cpu

Software Interface-
-Java Language
-Net Beans IDE
-Oracle DB server
Communication interface**-window**

Functional Requirement-
Vehicle entry: in this module we save the information of the vehicle entering.
Manage Vehicle-in this module we manage the vehicle.
Vehicle exit-this module enables to keep a track of returns to the vehicle.
Performance Requirement-
The capability of the computer depends upon the performance of the software. The software can take any no of inputs provided the database size is larger enough. This would depend on the availability on the available memory space.
System attributes-
Maintainability-There will be no maintained requirement for the software .The database is provided by the end user**.**
Portability-The system is developed for secure purposes, so it can't be portable.
Availability-This system will be available only until the system on which it is installed is running.
**Scalability-**Applicable

IV. ANALYSIS

Everyone who owns or drives a vehicle in India or abroad would be all too familiar with the hassles of finding parking spaces, misbehaving parking attendants, inconsistent or monopolized rates and other problems associated with it.

What is proposed here is not just another automation of manual workflow system, it can also be viewed as a solution to the aforementioned problems of the everyday consumer. Rise to the occasion, an automated vehicle system.

It not only rids the vehicle owner from the hassles of finding parking spots, it ensures that there is never over or under accommodation of vehicles beyond the lot's capacity.

Underneath is a graphical representation of workflows of stepwise activities and actions with support for choice, iteration, and cocurrency.in the unified modeling language activity diagram can be used to describe the business and operational step wise step workflows of components in a system.
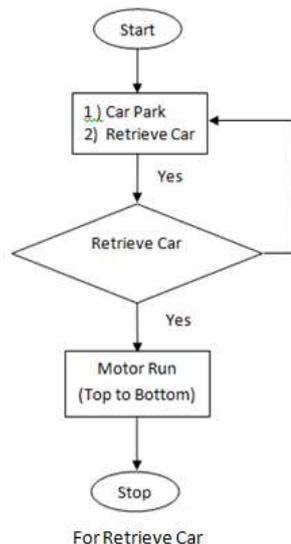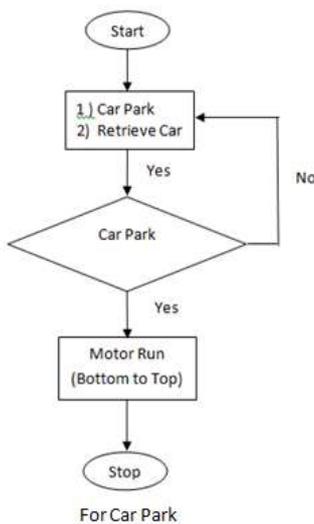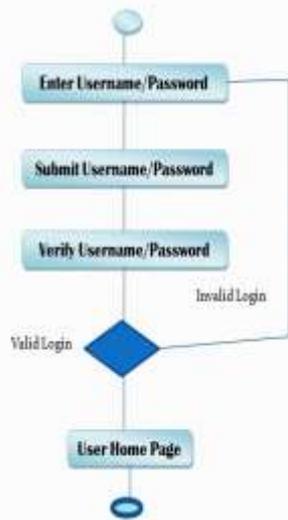
The working flowchart system for Automated Car Parking System
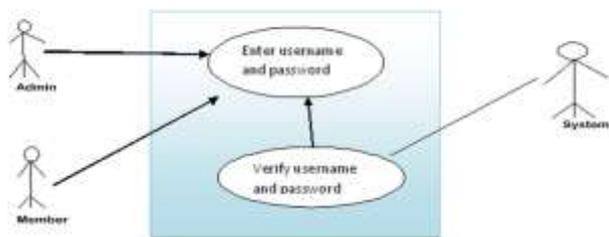
MATHS:

We are considering the parking as a service centre without looking at its internal features. This explains the long service time of the parking system.

Model M / M / 1

It is used to study a queuing system where the following applies: The customer arrival process follows the Poisson Allocation with an average arrival rate of λ per unit of time. The service process follows a Poisson distribution with an average number of customers served per Unit time equal to μ. That is, the service time follows the Exponential distribution with an average value of 1 / there is a service station. The number of customers at source is infinite (too large), customers are served

with FIFO discipline, they form a queue that has infinite capacity and does not leave as long as the tail is. The fundamental Relationship that must be in place for a state of Equilibrium can be found.

Model M / M / s

It is used to study a queuing system where the following applies: The customer arrival process follows the Poisson allocation with an average of arrivals λ per unit of Time. There are more than one parallel service (s> 1).The service time in each location follows the exponential distribution with an average number of customers served

at each location, per unit of time. The number of customers at source is practically infinite, customers are served on a FIFO basis, they form a queue that has infinite capacity and does not leave as long as the queue is and is Served by the first available service unit. The fundamental

Relationship that must be in place for a balance can

be found. Customers arrive by Poisson process at an average rate Of λ = 37.5 clients / hour, after the average time between Successive arrivals is 1.6 minutes (60 / 1.6 = 37.5). We have five uniform parking spaces, each having the same service rate (Poisson) at an average rate of at least one, which for each parking lot is equal to 10 customers per

Hour (after an average service time of 6 minutes). Because λ / sμ = 37,5 / (5x 10) = 37,5 / 50 = 0,75 <1 there is convergence in equilibrium mode and we can proceed to the calculations.

So, for the current A mode, in equilibrium mode, using the formulas for the M / M / s system, for λ = 37.5, μ = 10 and s = 5, we get the following system M / M / s, for λ = 37.5, μ = 10 and s = 5, we get the following:

First we calculate the probability P0 that is needed to Calculate the LqA to follow. So it is:

$$P_0 = \cfrac{1}{\left[\dfrac{\left(\dfrac{37,5}{10}\right)^0}{0!}\right] + \left[\dfrac{\left(\dfrac{37,5}{10}\right)^1}{1!}\right] + \left[\dfrac{\left(\dfrac{37,5}{10}\right)^2}{2!}\right] + \left[\dfrac{\left(\dfrac{37,5}{10}\right)^3}{3!}\right]}$$

$$+ \left[\dfrac{\left(\dfrac{37,5}{10}\right)^4}{4!}\right] + \left[\dfrac{\left(\dfrac{37,5}{10}\right)^5}{5!} \cdot \left(\dfrac{5 \cdot 10}{5 \cdot 10 - 37,5}\right)\right]$$

= 0.018681 (i.e., about 1.87%).

• Average waiting system length:

$$L_{qA} = \frac{\left(\lambda/\mu\right)^s \lambda\mu}{(s-1)!(s\mu - \lambda)^2} \cdot P_0 =$$

$$\frac{\left(\dfrac{37,5}{10}\right)^5 \cdot 37,5 \cdot 10}{(5-1)!(5 \cdot 10 - 37,5)^2} \cdot P_0 = 1{,}385367 \text{ customers}$$

$$L_A = L_{qA} + \frac{\lambda}{\mu} = 1{,}385367 + 37{,}5/10 = 5{,}135367 \text{ customers.}$$

V .CONCLUSION

The result of this mathematical analysis shows that the superiority of the automated parking system by the conventional parking system is overwhelming. This happens because the operating cost of the automated system is much less

than the operating cost of the conventional system, the average service time of each car is smaller so the people served are more of the same time and the waiting hours are less. Thus time and money are served.

From a proper analysis of positive points and constraints on the components it can be safely concluded that the product is a highly efficient GUI based component .This application is working properly and meeting all user requirements .This component can be easily plugged in many other systems. After doing study on smart parking project it is found that this system can be introduced in our Country and it will be beneficiary in the context of our country. The main benefits are time and fuel saving. It can also provide sustainable parking management in an eco-friendly manner. There is less maintenance cost for this system so it is helps the property developer in cost saving. It provides security to the parking ground. It reduces the hassle in parking grounds and traffic jam. It will also encourage Automation Engineering in our country which will make advancement in increasing usage of technology. Therefore, we should implement this project and help to develop our city.

VI. REFERENCES:

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