

On Demand Pricing and Resource Allocation for Parking with Space Utilization.

Rahul Vishwakarma¹, Manoj Bhosale², Narendra Chaudhary³, Prof. Soumitra Das⁴

Department of Computer Science Engineering

^{1,2,3} Student, D.Y. Patil School of Engineering, Lohegaon, Savitribai Phule Pune University, Pune

⁴ Professor, D.Y. Patil School of Engineering, Lohegaon, Savitribai Phule Pune University, Pune.

Abstract- *Parking in utmost cities, notably with heavy traffic, directly affects the flow of traffic and people's life also due to lack of parking space people face problem while parking vehicles which generally leads to parking of vehicles in restricted area. In this paper, we have a tendency to introduce a replacement sensible parking system that support intelligent resource allocation, reservation, rating and space utilization. The projected system solves this parking issues by providing guaranteed parking reservations which provides high revenue for parking managers with resource utilization. New honest rating policies are projected which will be imposed. The new system relies on mathematical modeling victimization mixed-integer applied mathematics (MILP) with the target of minimizing the overall financial value for the drivers and increasing the employment of parking resources*

Keywords- Dynamic pricing, dynamic resource allocation, mixed integer linear programming (MILP), and reservation, smart car parking

I. INTRODUCTION

Parking is a rich method in terms of either cash or the time and energy spent for the free spot chasing. Current studies reveal that an automobile is posing for ninety-five gift of its time period and solely on the road for the opposite five gift. If we have a tendency to take England in 2014 as AN example, on the average an automobile was driven for 361 hours a year in keeping with the British National Travel Survey yielding regarding 8404 hours during which a automobile would be pose. Currently wherever would you park your automobile for these terribly long hours? Cruising for parking is of course the primary drawback caused by the rise of automobile house owners globally. [2] On average, thirty gift of traffic is caused by drivers wandering around for parking areas. In 2006, a study in France unconcealed AN estimation that seventy million hours were spent each year in France solely in looking for parking that resulted within the loss of 700 million euros annually. [3] In 2011, a worldwide parking survey by IBM states that twenty minutes is spent on the average in looking for a desirable spot. With these statistics, we are able to assume that a good portion of worldwide pollution and fuel waste is expounded to cruising

for parking. Parking areas area unit found to be quite masses in some places and really rare to seek out in others. rating policies had vie a very important role within the overall parking accessibility for many years. Here comes the necessary question: can we have to be compelled to have additional parking areas or can we would like higher parking management? we have a tendency to believe it's the later and therefore the motivation behind this work is regarding higher parking management with honest and profitable rating policies. [6] The work given during this paper combines parking reservation and rating models to beat the parking issues.

In this paper, we have a tendency to make sensible automobile parking system, named on demand pricing and resource allocation with space utilization, with static resource planning, dynamic resource allocation and rating models, to optimize the parking system for each parking managers and drivers. The contributions of our work include: 1) increasing parking resource utilization 2) increasing parking slots at blank areas i.e. society space 3) increasing parking revenue 4) up parking expertise of drivers by lowering price, parking spot looking and walking times. Our work is completely different from the one in [8] wherever a dynamic resource allocation model was projected. The most limitations of that model area unit that solely reservation for restricted amount of your time (e.g., few minutes) was allowed, fastened value was used and revenue wasn't taken under consideration and solely one selection of destination was thought-about. Whereas our model permits a driver to order a car parking zone for any time in future, the revenue is taken into account and new rating models area unit introduced. Additionally, a parking answer with their individual journey planners is projected.

II. RELATED WORK

A. Existing Work

Smart parking system that's supported intelligent resource allocation, reservation, and evaluation. The projected system solves the present parking issues by giving warranted parking reservations with the bottom attainable price and looking out time for drivers and therefore the highest revenue

and resource utilization for parking managers. New truthful evaluation policies are projected that may be enforced in follow. The new system is predicated on mathematical modeling exploitation mixed-integer applied mathematics (MILP) with the target of minimizing the entire financial price for the drivers and maximizing the employment of parking resources. If there's any parking slot on the market in thus society/apartment, then existing system won't predict that to user so individuals cannot get advantage of it.

Disadvantages of Existing System

1. Limited by being suitable only for short-term reservations.
2. Parking revenue was not considered.
3. Time consuming

B. Proposed Work

We present a new smart car parking system, named on demand pricing and resource allocation for parking with space utilization, with static resource scheduling, dynamic resource allocation and Parking Availability Prediction models, to optimize the parking system for both parking managers and drivers.

The contributions of our work include:

- 1) Increasing parking resource utilization,
- 2) Increasing parking slots at blank spaces i.e. society area,
- 3) Increasing parking revenue,
- 4) Improving parking experience of drivers by lowering cost, parking spot searching and walking times.

Our work is totally different from the one in wherever a dynamic resource allocation model was projected. The most limitations of that model are that solely reservation for restricted amount of your time (e.g., few minutes) was allowed, mounted value was used and revenue wasn't taken under consideration and solely one selection of destination was thought of. Whereas our model permits a driver to order a parking lot for any time in future, the revenue is taken into account and new evaluation models are introduced.

We mix parking reservation and Parking Accessibility Prediction models to beat the parking issues.

In this system we offer extra profit that's we tend to conjointly predict people/user if there's any space/parking slot on the market in any society/apartment so people/user will park their vehicle in this space.

Advantages of proposed system:

1. Time Management
2. Cost Effective.
3. Increasing parking revenue
4. Predict any parking slot available in society/apartment for parking vehicle.

III. PROBLEM STATEMENT

In past days, there is ton of downside relating to vehicle parking, as a result of inconvenience of car park folks park their vehicles on road or in no car park, owing to it ton of traffic occur on road. It absolutely was terribly time intense method as a result of folks has to be compelled to search the car park manually. Therefore, to beat these problems we have a tendency to planning to implement system can which is able to mechanically predict or observe the empty parking slot space in order that user can simply park his/her vehicle while not holdup in looking out parking slots? Our system will save user time and additionally observe parking slot that area unit offered in nearest society or living accommodations. Our system can prove useful for peoples.

IV. SYSTEM ARCHITECTURE

In past days, there's heap of drawback concerning vehicle parking, thanks to inconvenience of park Individuals Park their vehicles on road or in no park, owing to it heap of traffic occur on road. It absolutely was terribly time intense method as a result of individuals needs to search the park manually. Thus to beat these problems we have a tendency to aiming to implement system can which is able to mechanically predict or notice the empty parking slot space in order that user can simply park his/her vehicle while not delay in looking parking slots? Our system will save user time and conjointly notice parking slot that area unit out there in nearest society or housing. Our system can prove helpful for peoples.

On demand pricing and resource allocation for parking with space utilization is good automobile parking for smart town theme over a manual automobile parking system we have a tendency to construct a special on-line based mostly automobile parking theme, during this projected system user

makes and request to the central server for parking and book parking earlier by creating a payment. In depth experiments area unit conducted to demonstrate the potency of the projected theme.

- Abundant works for looking a parking region are projected beneath quickest neighborhood node algorithmic rule i.e. kNN algorithmic rule.
- Recently, some dynamic schemes are projected to support for parking and payment.

This paper proposes a secure KNN-based search theme by revering a GPS location, and assures parking of automobile earlier. During this system one agent is projected for keep attention on parking regions by getting time in time to end manner.

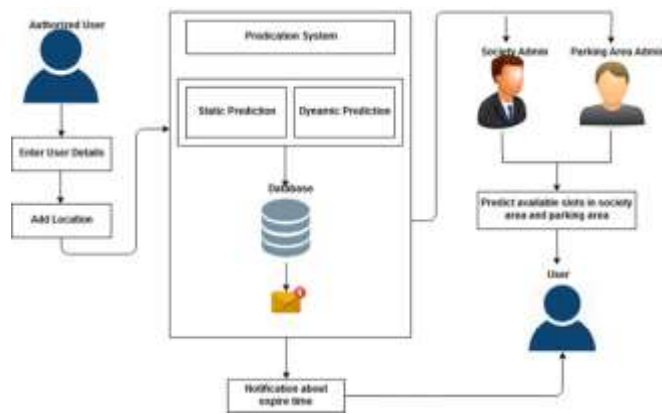
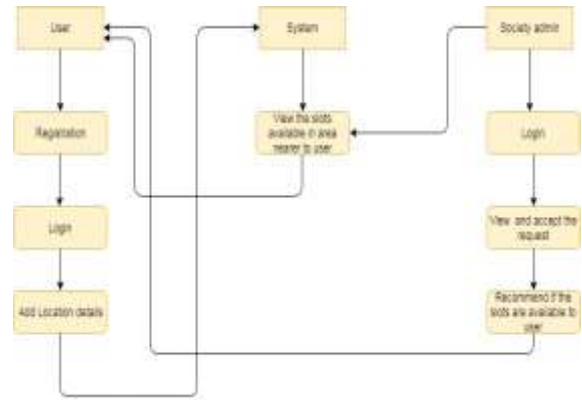


Fig. System Architecture

V. UML DIAGRAMS



VI. FLOW DIAGRAM



Description:

Our work is different from the one in where a dynamic resource allocation model was proposed. The main limitations of that model are that only reservation for limited period of time (e.g., few minutes) was allowed, fixed price was used and revenue was not taken into account and only a single choice of destination was considered. Whereas our model allows a driver to reserve a parking space for any time in future, the revenue is considered and new pricing models are introduced.

We combine parking reservation and Parking Availability Prediction models to overcome the parking problems.

V. MATHEMATICAL MODEL

Let 'S' be the system

Where

$$S = \{F, O, P\}$$

Where,

F = Set of input parking info

O = Set of output (response for parker)

P = Set of technical processes

- Let 'S' is the system

$$S = \{ \dots \dots \dots \}$$

- Identify the input data S1, S2, ..., Sn

$$F = \{ \text{user location, request for parking, timing} \}$$

- Identify the output applications as O

$$= \{ \text{location based parking slots info} \}$$

- Identify the Process as P

P= {location capturing, searching records, recommending, filtering slots information}

Output: Recommend the slots available in parking area and society area.

VI. HARDWARE AND SOFTWARE REQUIREMENT

Database Requirements

1-MySQL

Software Requirements

- Operating system : Windows 7/8.
- Coding Language : JAVA
- IDE : Android Eclipse
- Database : MySQL

Hardware Requirements

- System : I3 processor 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 MB.
- Monitor : 15 VGA Colour.
- Ram : 2 GB.
- Mobile : Android 4.4 onwards

VII. RESULTS AND DISCUSSION

Parameter	Existing system	Proposed System
A	10	4
B	10	4
C	8	8
D	10	3
E	8	2

Table 1: Result Table

- A = Computation Cost.
- B = Time Consumption.
- C = Scalable.
- D = Waiting Time.
- E = User Friendly.

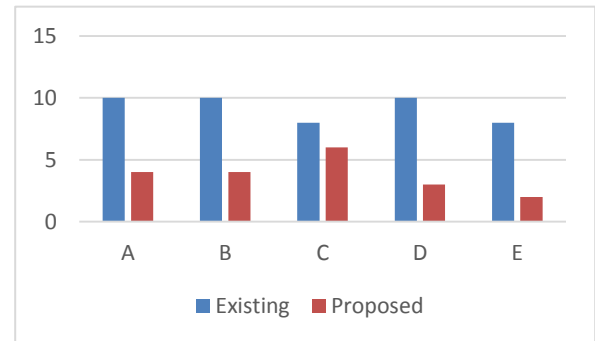


Fig.2: Time line chart of Result Analysis

VII. ALGORITHM

- KNN:** “k-Nearest Neighbors” KNN can be used for both classification and regression predictive problems. However, it is more widely used in classification problems in the industry. To evaluate any technique we generally look at 3 important aspects

- Ease to interpret output
- Calculation time
- Predictive Power

- Haversine Algorithm** The Haversine formula calculates the shortest distance between two points on a sphere using their latitudes and longitudes measured along the surface. It is important for use in navigation. The haversine can be expressed in trigonometric function as:

$$haversine(\theta) = \sin^2\left(\frac{\theta}{2}\right)$$

- Central angle Haversine can be computed, between two points with r as radius of earth, d as the distance between two points, ϕ_1 is latitude of two points and λ_1 is longitude of two points respectively, as:

$$haversin\left(\frac{d}{r}\right) = haversin(\phi_2 - \phi_1) + \cos(\phi_1) \cos(\phi_2) haversin(\lambda_2 - \lambda_1)$$

- AES:-** Advanced Encryption Standard (AES). It is found at least six time faster than triple DES. A replacement for DES was needed as its key size was too small. With increasing computing power, it was considered vulnerable against exhaustive key search attack. Triple DES was designed to overcome this drawback but it was found slow. The features of AES are as follows –Symmetric key symmetric block cipher 128-bit data, 128/192/256-bit keys Stronger and faster than Triple-DES Provide full specification

and design details Software implementable in C and Java .Plaintext refers to the data to be encrypted. Ciphertext refers to the data after going through the cipher as well as the data that will be going into the decipher. The state is an intermediate form of the cipher or decipher result usually displayed as a rectangular table of bytes with 4 rows and 4 columns.

4. SMTP

SMTP is a push protocol and is used to send the mail whereas POP (post office protocol) or IMAP (internet message access protocol) are used to retrieve those mails at the receiver's side. SMTP is an application layer protocol. The client who wants to send the mail opens a TCP connection to the SMTP server and then sends the mail across the connection. The SMTP server is always on listening mode. As soon as it listens for a TCP connection from any client, the SMTP process initiates a connection on that port (25). After successfully establishing the TCP connection the client process sends the mail instantly. The end to end model is used to communicate between different organizations whereas the store and forward method are used within an organization. A SMTP client who wants to send the mail will contact the destination's host SMTP directly in order to send the mail to the destination. The SMTP server will keep the mail to itself until it is successfully copied to the receiver's SMTP.

The client SMTP is the one which initiates the session let us call it as the client- SMTP and the server SMTP is the one which responds to the session request and let us call it as receiver-SMTP. The client- SMTP will start the session and the receiver-SMTP will respond to the request.

VIII. CONCLUSION

In this paper we've planned a new sensible parking system that is predicated on MILP model that produce optimum answer for dynamic and static allocation of parking resources to users providing multiple reservation choices. In this paper we have introduced the mixture of period reservations with share-time reservations, dynamically playing system choices (reservation time constraints and pricing) in keeping with period utilization info, and providing the drivers the selection of selecting multiple destinations and reservation kind. We have tend to planned rating policies for each static and dynamic reservation that maximize to take the advantage of parking. Finally we tend to found the perfect use of parking

resources and therefore assist in eliminating the general traffic jam caused by parking.

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