iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** III **Month of publication:** March 2018

DOI: http://doi.org/10.22214/ijraset.2018.3009

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue III, March 2018- Available at www.ijraset.com

Android based Smart Parking System using Internet of Things Technology

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Abstract: ***Recently the upcoming technology of IOT is being used to solve many common problem, this IOT based smart parking system also use for the effective deployment of the smart parking system. The smart parking system is relatively new system which creates a platform for easy booking of parking slots and effectively manages the parking in a public sector and private sector area. The basic feature of the parking system is to make it easier for the customer to select the slot, and for the in-charge in a quick manner. Using the technology of QR code we authenticate the users who are already park the vehicle or will be parking the vehicle and make the identification of the user efficient. Thereby, implement this technology and make the life easier for the user and create a benchmark for future development.***
Keywords: IOT, Android, GPS, Smart Phones, Parking Navigation.

I. INTRODUCTION

Traffic caused by vehicle is an alarming problem at a worldwide scale and it has been growing exponentially. Car parking problem is a major contributor and has been, still a major problem with increasing vehicle size in the luxurious segment and confined parking spaces in urban cities. Finding a parking space is a routine (and often frustrating) activity for many people in cities around the world. This search burns about one million barrels of the world's oil every day. In the world every human wants to buy his own vehicle because of this reason in worldwide number of cars increase day by day and parking problem also increase. As the worldwide population continues to urbanize, without a well-planned, convenience-driven retreat from the car these problems will worsen. Proposed system give information about available parking space and available parking slots in particular register parking area and process is real-time to place vehicles at available positions. It involves using low-cost sensors, real-time data collection, and mobile-phone-enabled automated payment systems that allow people to reserve parking in advance or very accurately predict where they will likely find a spot.

A. Related Work

In some studies, the authors proposed a new algorithm for treatment planning in real-time parking. First, they used an algorithm to schedule the online problem of a parking system into an offline problem. Second, they set up a mathematical model describing the offline problem as a linear problem. Third, they designed an algorithm to solve this linear problem. Finally, they evaluated the proposed algorithm using experimental simulations of the system.

The experimental results indicated timely and efficient performance. However, these papers do not mention the resource reservation mechanism (all parking requirements are derived immediately and are placed in the queue), the mechanism for assessing the resources system, the mechanism to guide vehicles to the parking space, the mechanism for handling situations when the request for service is denied and do not calculate the average waiting time and average total time that each vehicle spends on the system. This system can collect information about the state of occupancy of the car parks, and can direct drivers to the nearest vacant parking spot by using a software application.

However, in this work, the authors have no mathematical equations for the system architecture and do not create a large-scale parking system. The results of this paper only implement the proposed architecture; they do not mention the performance of the parking system.

Other researchers have designed architecture for parking directorate in smart cities.

The main aim of this architecture is overcoming current public parking management solutions. This architecture provides vehicle owners with information about on-street parking stall availability and allow vehicle owners to reserve the most convenient parking stall at their destination before their departure. In this paper, discusses about project which presents a small model of an automated car parking system. That can control and manage the number of cars that can be parked in a given area at any given time based on the availability of parking spaces.

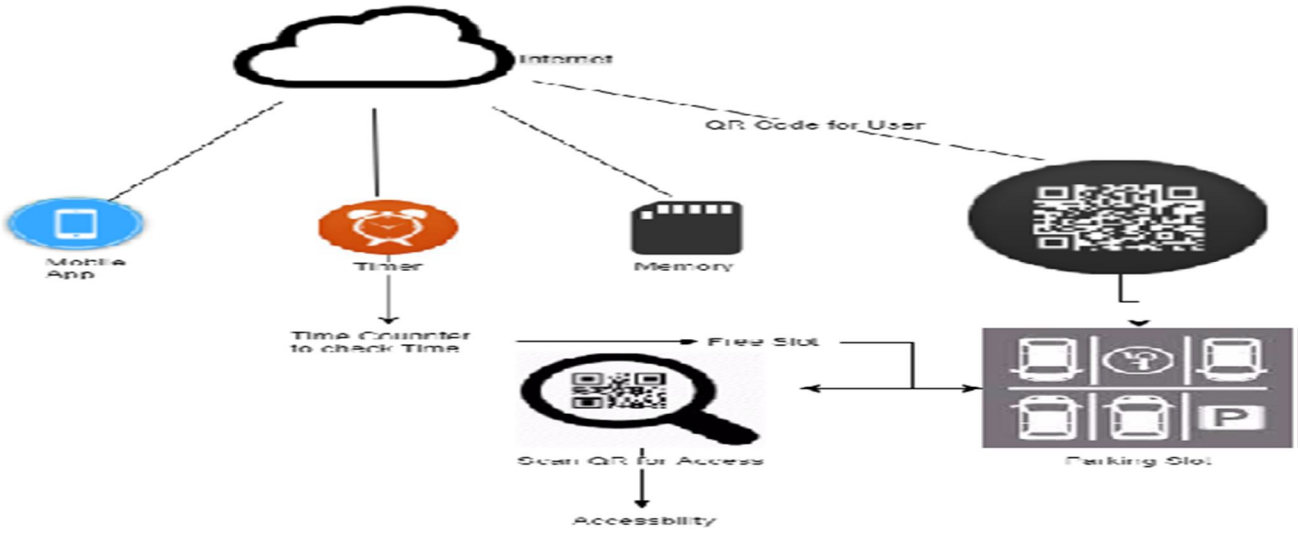
B. Organization

This paper is organized as follows: Section II describes the proposed architecture. Section III discusses the algorithms and the mathematical models of the system. Section IV is the implementation of the system. Section V is our conclusion and suggestions for future work.

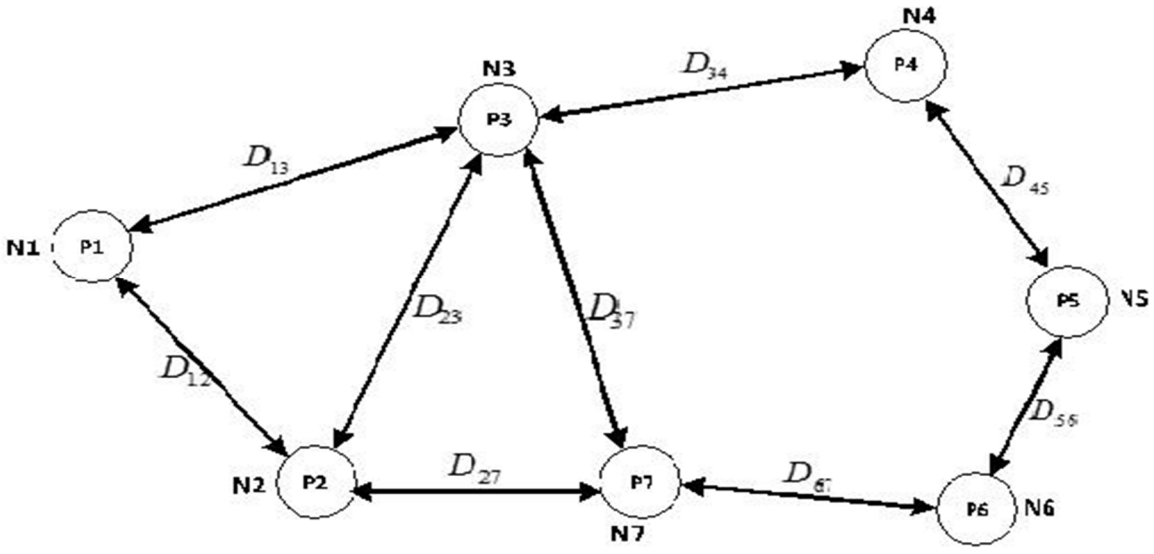
II. PROPOSED ARCHITECTURE

A. System Overview

The system is derived from the idea of Internet of Things technology. The system uses QR code to monitor car. It means driver first search for the nearest parking spaces. It will choose the nearest parking location then driver was mention the time for parking . then he will book for the parking and pay for this. Once driver has pay then it gives the QR code. And this way driver book the parking before departure. For park the car driver reach to the parking location, then it will first scan the QR code on entry gate



It will successfully scan the QR code then automatic barrier gate can be open, driver enters the parking stall and finally park the car. Also at check out time the same QR code again scanned. Then system displays the one parking space is available.



N1 D 100 spaces, N_2 D 120 spaces, N_3 D 200 spaces,
N_4 D 100 spaces, N_5 D 120 spaces, N_6 D 120 spaces,
N_7 D 100 spaces; D_{12} D 1:2 km, D_{13} D 1:6 km,
D_{23} D 2:0 km, D_{27} D 1 km, D_{34} D 1:5 km, D_{37} D 1:8 km, D_{45} D 1:2 km, D_{56} D 0:8 km and D_{67} D 1:2 km. These parameters are

shown in Fig. 5 using simple neighbour tables. In Fig. 5, we assume that the total free spaces in N_1 D 20, in N_2 D 60, in N_3 D 60, in N_4 D 70, in N_5 D 60, N_6 D 30 and in N_7 D 60. To increase the performance of finding a free parking resource, the neighbor table in each node contains information on the current number of free parking resources in the neighbouring nodes. Our idea is to use the number of total free parking resources in each node to calculate the cost for choosing a car park.

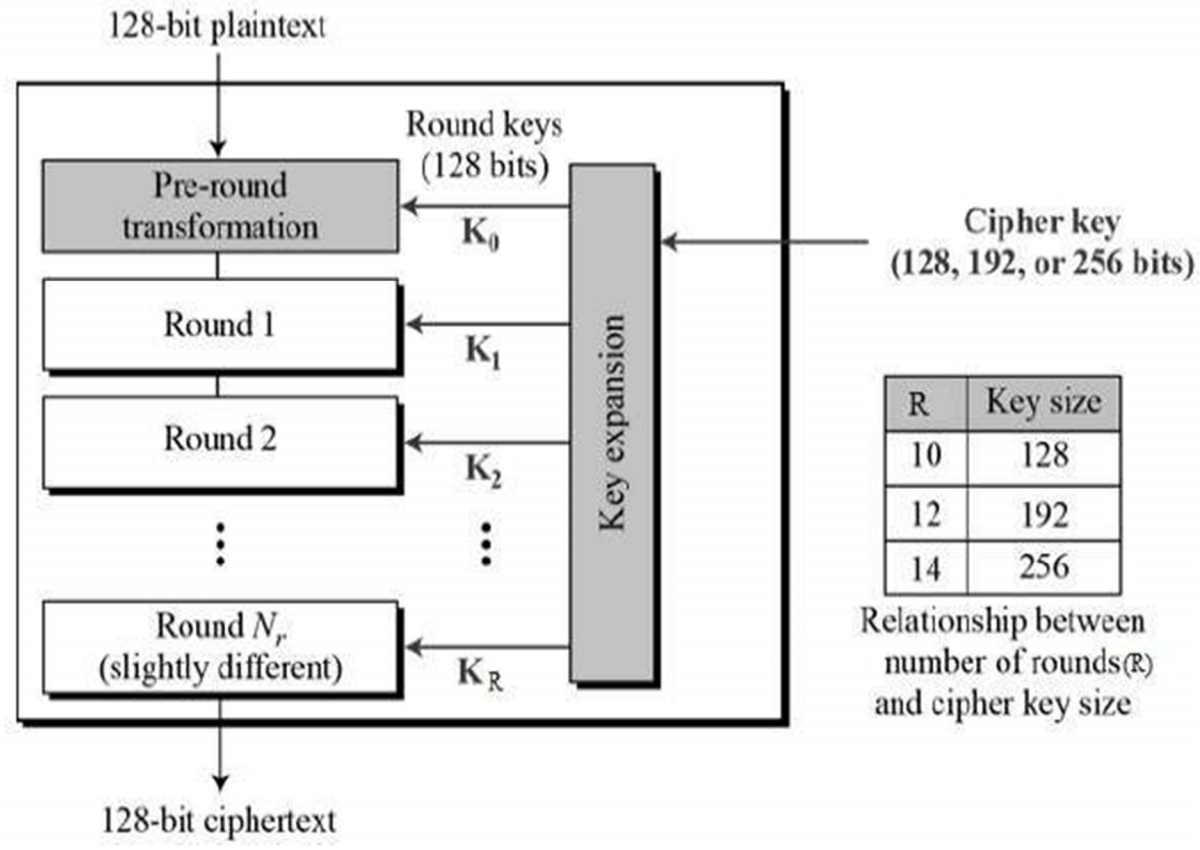
III. ALGORITHM AND MATHIMATICAL MODEL

A. Algorithm

We propose an algorithm to describe the operation of the system

1) *AES(Advanced Encryption Algorithm):* The more popular and widely adopted symmetric encryption algorithm likely to be encountered nowadays is the 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. AES is an iterative rather than Feistel cipher. It is based on 'substitution–permutation network'. It comprises of a series of linked operations, some of which involve replacing inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations). Interestingly, AES performs all its computations on bytes rather than bits. Hence, AES treats the 128 bits of a plaintext block as 16 bytes. These 16 bytes are arranged in four columns and four rows for processing as a matrix . Unlike DES, the number of rounds in AES is variable and depends on the length of the key. AES uses 10 rounds for 128-bit keys, 12 rounds for 192-bit keys and 14 rounds for 256-bit keys. Each of these rounds uses a different 128-bit round key, which is calculated from the original AES key.

The schematic of AES structure is given in the following illustration −



R	Key size
10	128
12	192
14	256

Relationship between number of rounds(R) and cipher key size

2) *KNN (Nearest Neighbour):* K nearest neighbors is a simple algorithm that stores all available cases and classifies new cases based on a similarity measure (e.g., distance functions). KNN has been used in statistical estimation and pattern recognition. All instances correspond to points in an n-dimensional Euclidean space Classification is delayed till a new instance arrives. Classification done by comparing feature vectors of the different points. Target function may be discrete or real-valued.

B. Mathematical Model

System Description:

Let S be a system that describes smart parking system

System for solve the traffic problem in parking area.

1) S= Smart Parking System

2) Identify input as S= {I, ...}, Let I={i} input will be search nearest parking area

3) Identify output as O S = {I, O, } O= Nearest Parking areas displa

4) Identify the processes as P S= {I, O, P, ..} P= {E, D} E= {parameter, Nearest parking areas} D= {parameter, get QR code}

5) Identify failure cases as F S={I,O,P,F,.} F=Failure occurs when the internet not available.

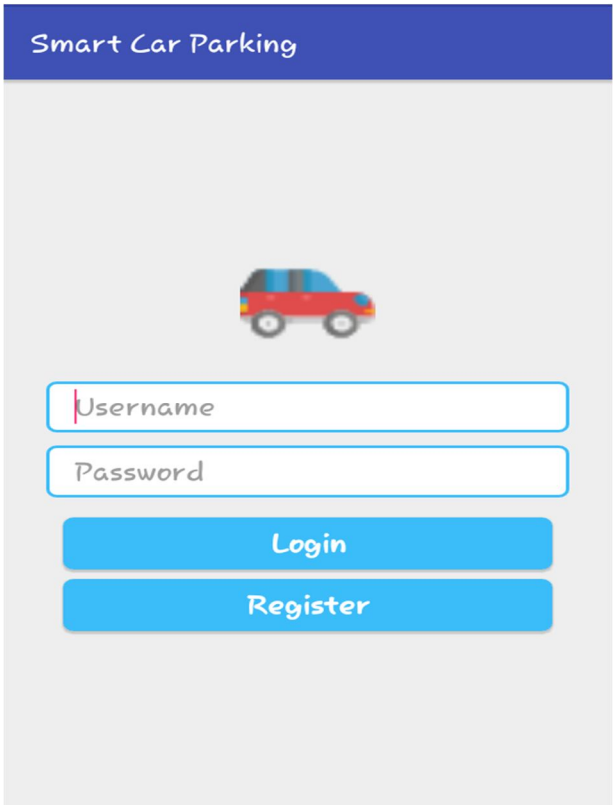
6) Identify success as s. S={I,O,P,F,s,} s=User book parking slot and park his vehicle successfully

7) Identify the initial condition as Ic S={I, O, P, F, s, Ic,} Ic=GPS tracking.

IV. IMPLEMENTATION

A. Software System

We designed a software client that runs on a smart phone based on the Android platform, which was built from the ground up to enable developers to create compelling mobile applications that take full advantage of all that a handset can offer. In this phase, we use the Android SDK Tools, which is a set of development tools used to develop applications for Android platform that can be used to write Android programs in the command prompt. The most common method is using an integrated development environment. In our ideal concept, users who want to use our system must be registered as a member of the system. Our server is implemented on SQL, and we use SQL server as our database. SQL database is a distributed, scalable, and large data store. Following fig. shows the login interface of the system.



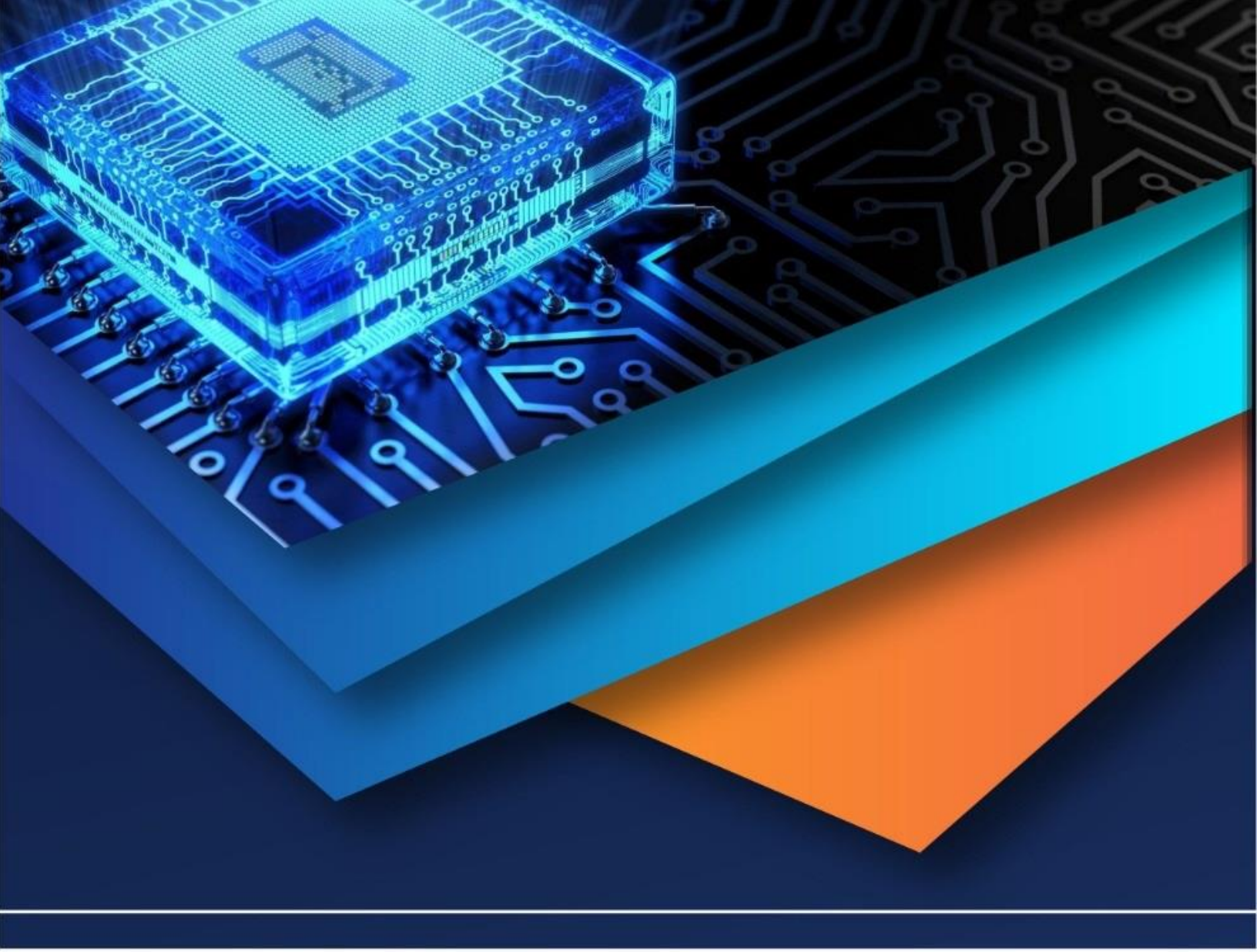
V. CONCLUSION

This paper has proposed a parking system that improves performance by reducing the number of users that fail to find a parking space and minimizes the costs of moving to the parking space. Algorithm significantly reduces the average waiting time of users for parking. Our system achieved the best solution when most of the vehicles successfully found a free parking space. The total average waiting time of car park service becomes minimal, and the total time of each vehicle in car park is reduced. For identification of

register user system use QR code. In our future study, we will consider the security aspects of our system as well as implement our proposed system in large scales in the real world.

REFERENCES

[1] Y. Geng and C. G. Cassandras, ``A new `smart parking' system based on optimal resource allocation and reservations," in Proc. 14th Int. IEEE Conf. Intell. Transp. Syst. (ITSC), Oct. 2011, pp. 979 984.
[2] L. Mainetti, L. Palano, L. Patrono, M. L. Stefanizzi, and R. Vergallo, ``Integration of RFID and WSN technologies in a smart parking system," in Proc. 22nd Int. Conf. Softw., Telecommun. Comput. Netw. (SoftCOM), 2014, pp. 104 110.
[3] W. D. Kelton, R. Sadowski, and N. Zupick, Simulation With Arena, 6th ed. New York, NY, USA: McGraw-Hill, 2014
[4] C. Rhodes, W. Blewitt, C. Sharp, G. Ushaw, and G. Morgan, ``Smart routing: A novel application of collaborative path- nding to smart parking systems," in Proc. IEEE 16th Conf. Bus. Infom., Jul. 2014, pp. 119 126.
[5] D. J. Bonde, R. S. Shende, K. S. Gaikwad, A. S. Kedari, and A. U. Bhokre, ``Automated car parking system commanded by Android application," in Proc. Int. Conf. Comput. Commun. Inform. (ICCCI), Coimbatore, India, Jan. 2014, pp. 1 4.
[6] N. Mejri, M. Ayari, R. Langar, F. Kamoun, G. Pujolle, and L. Saidane, ``Cooperation versus competition towards an ef cient parking assignment solution," in Proc. IEEE Int. Conf. Commun., Sydney, NSW, Australia, Jun. 2014, pp. 2915 2920.
[7] K. Ashokkumar, R. B. Sam, and B. Arshadprabhu, ``Cloud based intel-ligent transport system," in Proc. 2nd Int. Symp. Big Data Cloud Comput. (ISBCC), vol. 50. 2015, pp. 58 63.
[8] M. Du, J. Fang, and H. Cao, ``A new solution for city parking guiding based on Internet of Things and multi-level multi-agent," in Proc. Int. Conf. Electron., Commun. Control (ICECC), 2011, pp. 4093 4096.
[9] X. Zhao, K. Zhao, and F. Hai, ``An algorithm of parking planning for smart parking system," in Proc. 11th World Congr. Intell. Control Autom. (WCICA), 2014, pp. 4965 4969.
[10] R. E. Barone, T. Giuffrè, S. M. Siniscalchi, M. A. Morgano, and G.Tesoriere, ``Architecture for parking management in smart cities," IET Intell. Transp. Syst., vol. 8, no. 5, pp. 445 452, 2014.
[11] Z. Ji, I. Ganchev, M. O'Droma, and X. Zhang, ``A cloud-based intelligent car parking services for smart cities," in Proc. 31st URSI General Assembly Sci. Symp. (URSI GASS), Aug. 2014, pp. 1 4.



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