



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 5, May 2023



Impact Factor: 8.423

Smart Parking System Using QR Code

Prof. Anita.D.Gawali¹, Ms. Ashwini Chavan², Mr. Swapnil Borse³, Ms.Vaishnavi Dighe⁴,
Mr. Swapnil Shinde⁵

Professor, Department of Information Technology, Amrutvahini College of Engineering, College, Maharashtra, India¹

Student, Department of Information Technology, Amrutvahini College of Engineering, College, Maharashtra, India^{2,3,4,5}

ABSTRACT:With the increase in traffic and traffic in the city, it has become difficult to find a parking place in the usual place. It will be more difficult to park in crowded and unfamiliar places. The pre-planning system pre-arranges parking spaces for vehicles via an app, listing available parking spaces and their prices. The application is designed as a mobile android application between the user module and the admin module so that it is useful for everyone. Identify the empty parking lot with detailed information with the help of the KNN algorithm. The QR code is used to ensure that the vehicle is parked in the car park first. A framework designed to offer a small IoT model for smart parking use in a busy city using a parking map..

KEYWORDS:SmartParking, QR code, Microcontroller, KNN, IoT, .

I. INTRODUCTION

The daily process of finding parking without parking is often ineffective: it increases driving time, traffic, fuel consumption and emissions. To solve these problems, smart parking systems have been proposed to help drivers find their parking spots faster by using new technology and communication tools. Smart parking is important as it determines the profitability of the parking lot owner and the performance of the vehicles that need to be parked. Parking can be divided into two categories: on-street parking and off-street parking. On-street parking refers to the right to park on the side of the road, while off-road parking refers to the right to park in a parking lot. Building new garages is very difficult these days. As the automobile industry grew exponentially, the parking problem increased at the same rate. Most of the existing stations contain various sensors such as ultrasonic sensors, GPS (Global Positioning System). The installation cost of this type of sensors requires a large investment as well as regular maintenance costs. These types of sensors do not work in open parking spaces. Most sensors are easily affected by rain or sunlight. These methods cannot solve many of the problems that exist in the parking industry. The use of hydraulics in modern automated parks requires large capacity and electricity investment. The new car park needs to be converted to the existing structure and is not possible for the nursery. The cost of building new stations and sensors is the reason hardware-based stations are not popular. The proposed new system could also overcome the problem of using manpower to operate modern stations.

The motivation behind the proposed system is to reduce the time and human effort spent searching for a parking space. To find our nearest car park, check where you parked your car and scan the QR code for confirmation. The system reduces the time spent searching for the nearest parking lot. The purpose of this system is to reduce the time and personnel spent searching for a parking space, to follow the parking lot to the nearest place to us, to search for an empty parking lot, to protect the parking dispute..

The paper is prepared as follows. The first part introduces the system and the second part presents the early station and data analysis. The Part III system presents its approach and architecture. It ensures the flow of water in the system. Chapter IV presents the experimental results showing the results of the experimental images. Finally, Part V offers a conclusion.

II. RELATED WORK

1) Safe and Energy Efficient Smart Parking with Edge Computing:

Examine Edge computing, a key technology that provides sensor-level processing, is an important aspect of data privacy and security in smart parking applications. Smart Parking will be able to direct drivers to the parking lot, which will reduce or even eliminate the problems in the existing system. It is worth noting that securing the smart station is necessary because IoT devices are vulnerable to security attacks. In addition, the introduction of energy savings in smart stations will ensure peace and a reasonable standard.

2) Mobile Application for Smart Parking Systems

Smart parking is an application that helps users to get information about available parking space at a place. There are many technologies in smart parking that can solve parking problems. IoT is used by connecting the sensor devices scattered at each station to the internet network and then storing the data of each sensor on the server. A device such as the ESP8266-01 is required to connect the sensor to the internet network. This tool helps Arduino connect to Internet network.

3) Enhanced Framework for Secure Smart Parking Management

The Internet of Things (IoT) connects millions of devices and services anytime, anywhere, providing a variety of applications. The Internet of Things (IoT) connects surrounding objects to the Internet, making them accessible from any remote location. Intelligent parking systems usually collect data about available parking spaces in certain areas and process this information in real time, allowing vehicles to park in these areas.

4) A Digital Twin Prototype for Smart Parking Management

An example of the smart parking application was developed and tested in several parking lots. Research results show the effectiveness of methods and techniques in determining parking and vehicle tracking. The plan provides a cost-effective solution for drivers and vehicle owners. It also helps drivers identify parking spaces around their location and allows park owners to monitor their location in real time, providing an easy-to-use experience..

5)Arduino project for smart parking system

The system controls which vehicles are allowed to enter the parking lot while blocking illegal vehicles. Currently, smart parking or parking instructions only receive parking information using the sensor network and distribute it only to drivers. In this project, we will use Arduino UNO, Servo Motor, IR Sensor and LCD screen. Infrared sensors detect vehicles entering and leaving the parking lot and send signals to Arduino; The LCD shows the number of stations..

6)A survey on smart parking systems in urban cities

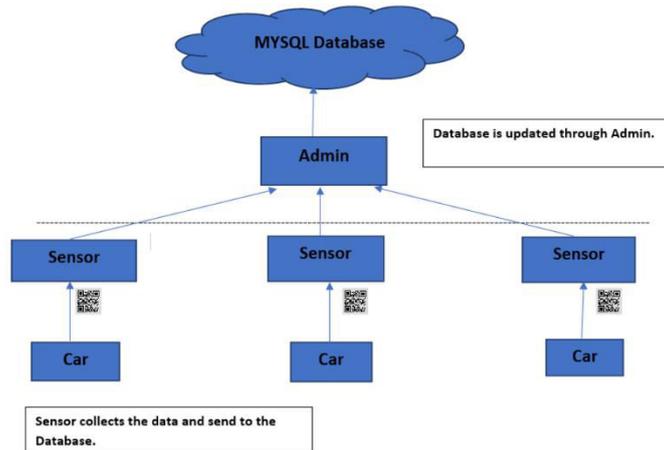
Intelligent parking sensors and technology help drivers find free parking spaces on their way to their destination. In this article, we review the most recent publications in the last 5 years, mostly about stop smart cars developed with sensors, embedded systems, situational awareness and IoT, considering the needs, wishes and needs of urban areas. The system saves time, fuel, energy and reduces the stress of the driver. To achieve this goal, we review different models of smart parking solutions based on algorithmic formalisms, theoretical frameworks, formal models, smart device-based prototypes and real-time applications and verify the accuracy of the system.

7)IoT based smart parking model using Arduino UNO with FCFS priority scheduling

Based on the smart automatic parking model using IoT, meters and Arduino UNO (which means "Uno" in Italian), the parking system can find solutions to parking problems. Empty cars for main model parking to monitor and reduce users' call times to make appointments. learning that the user is an expert. This study introduces an automatic parking system based on IoT platform and real-time detection of all empty parking spaces with the help of sensors. The Arduino UNO platform brings automation to all users who primarily use real-time technology.

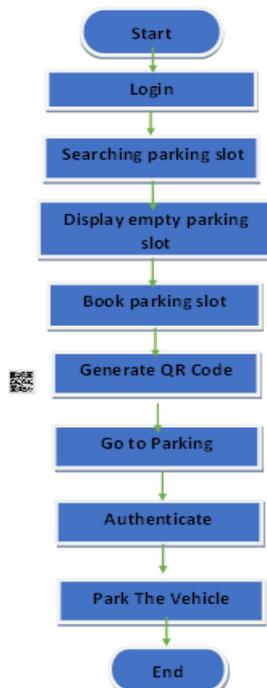
III. METHODOLOGY

A) System Architecture:



B) System Flow

The application is developed as mobile android app for user module and admin module to make it useful for everyone. The empty parking places with details are identified with help of KNN algorithm. QR code is used for authentication for parking the vehicle at pre-booked parking space. The system developed shows small IoT prototype for implementing smart parking in busy unknown cities with known map to parking slot for vehicle.



C) Algorithm

K-NEAREST NEIGHBOR(KNN)

Apart from keeping all the data, KNN does not use different models that are not separated from each other and therefore does not require progressive learning. KNN tries to make predictions using the training data directly. The KNN estimates for a new sample (x) by searching all data for the k best-matched samples (eg, neighbors) and calculating the variance of k samples. Figure 3 below shows the flowchart of the K-Neighbor Algorithm.

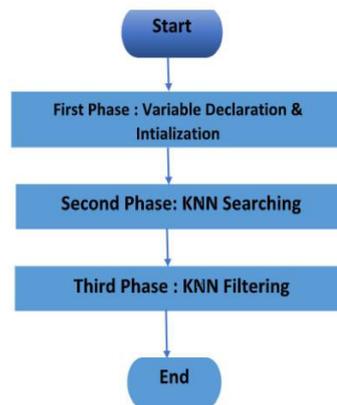


Fig. 3. Flowchart of K- Nearest Neighbour Algorithm

- Ease of interpretation of the output: Using KNN makes it easy and simple to predict the output compared to other algorithms.
- Calculation time: KNN requires very little time because the training phase is skipped and the information contained in the database can be used directly in the testing phase.
- Forecasting ability: KNN is best for forecasting.

Prediction using the KNN algorithm provides a good solution.

(a) KNN SEARCHING

- 1) Start
- 2) For me: = 1 for pixels to make_in_the_image
- 3) for j:=1 to pixels_in_the_window do
- 4) compute the euclidean distance between i and j
- 5) end for
- 6) Sorting an array containing the distance
- 7) select the K nearest neighbours
- 8) Change window border to next pixel
- 9) end for

b) KNN FILTERING

- 1) Start
- 2) for i:=1 to pixels_in_the_image do
- 3) for j:=1 to pixels_in_the_classes do
- 4) for k:=1 to K do
- 5) sum the SVM probabilities
- 6) end for
- 7) divide each probability for K
- 8) end for
- 9) select the highest probability
- 10) assign the label to the pixel

11) end for

(c) KNN WORK

Step-1: Select the number K of the neighbors.

Step-2: Calculate the Euclidean distance of K number of neighbors

Step-3: Take the K nearest neighbors as per the calculated Euclidean distance.

Step-4: Among these k neighbors, count the number of the data points in each category.

Step-5: Assign the new data points to that category for which the number of the neighbor is maximum.

Step-6: Our model is ready.

IV. EXPERIMENTAL RESULTS

1) Experimental Setup

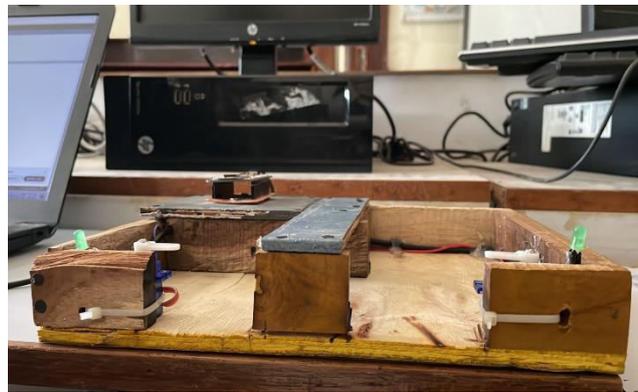
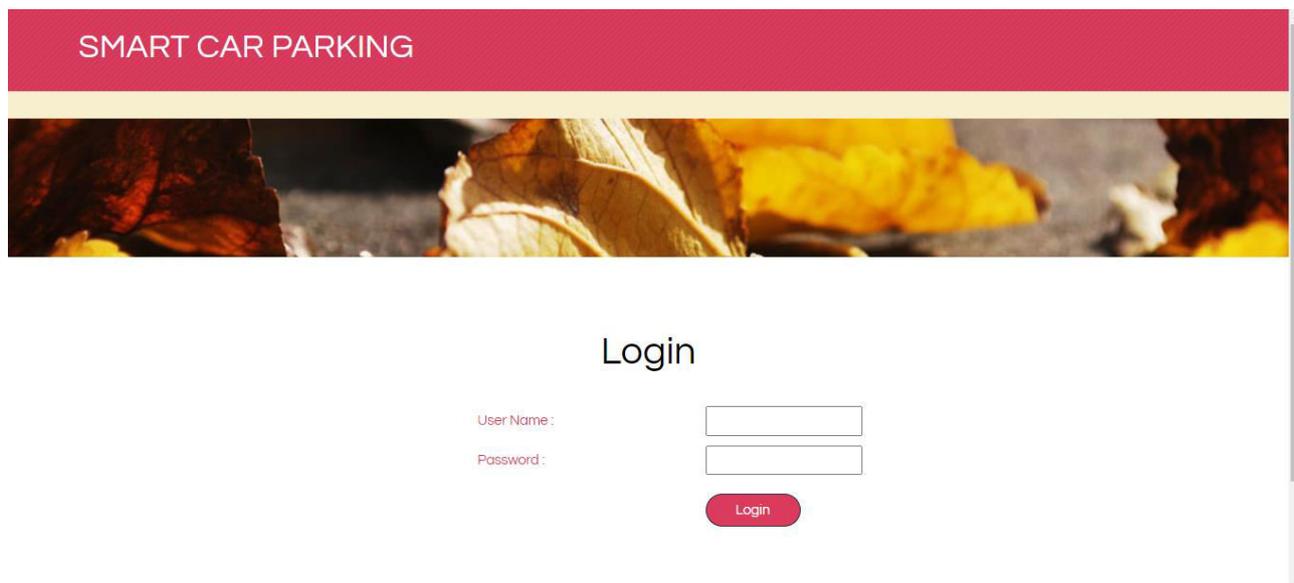


Fig: Experimental Set Up For Smart Parking

2) Admin Screen





|| Volume 12, Issue 5, May 2023 ||

| DOI:10.15680/IJIRSET.2023.1205124 |

SMART CAR PARKING

[View User Details](#) [View Node Details](#) [Update Fare](#) [Payment History](#) [Logout](#)



Welcome to Smart Car Parking System

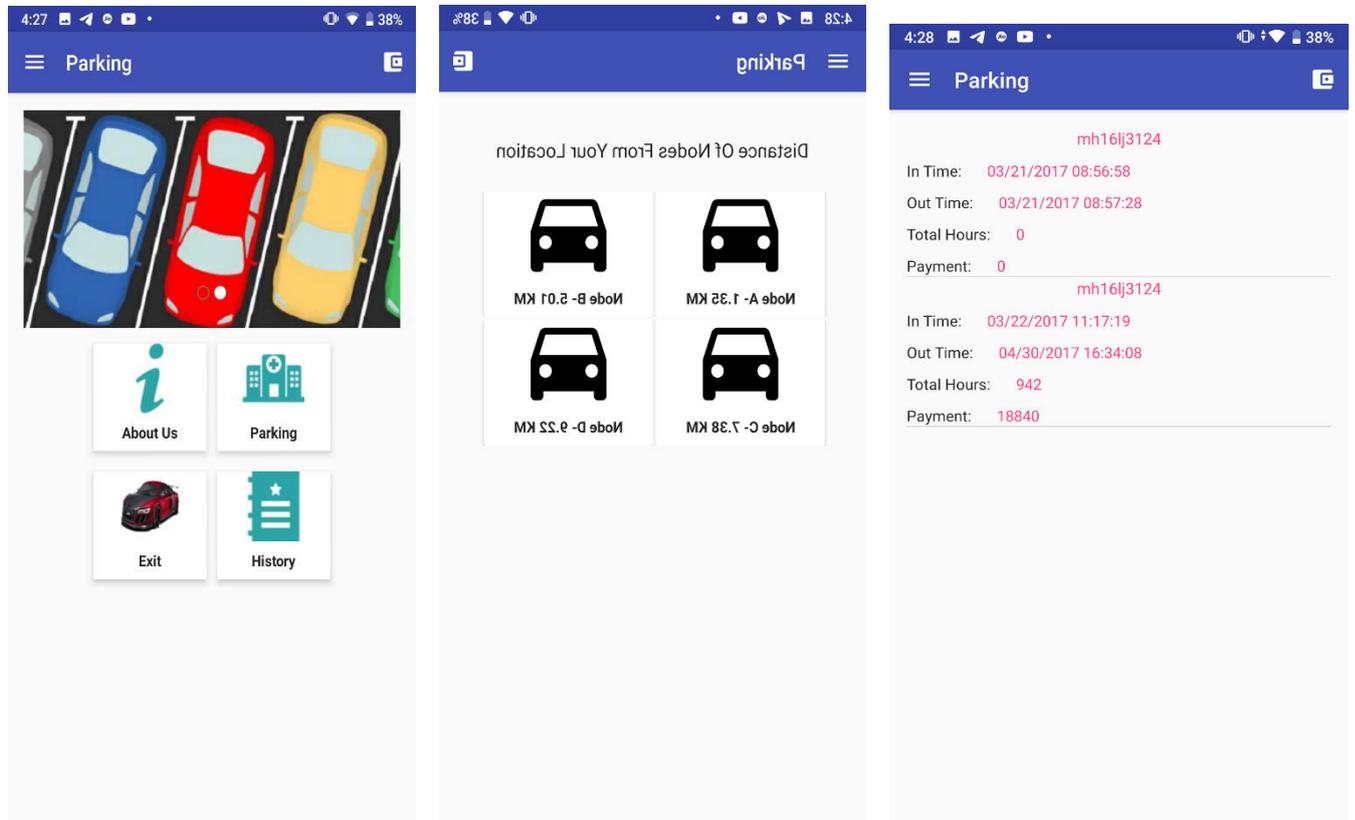
[View User Details](#) [View Node Details](#) [Update Fare](#) [Payment History](#) [Logout](#)



User List

| Id | Full Name | Email | Password | Mobile | City |
|----|-----------------|----------------------|----------|------------|----------------|
| 1 | Ashwini Chavan | ashwini1@gmail.com | ***** | 9890430022 | Sambhaji Nagar |
| 2 | Swapnil Borse | swapnil2@gmail.com | ***** | 9894001120 | Nasik |
| 3 | Swapnil Shinde | shinde3@gmail.com | ***** | 9503986854 | Sangamner |
| 4 | Vaishnavi Dighe | vaishnavi4@gmail.com | ***** | 9890430022 | Sangamner |

3) User Screen



V. CONCLUSION

Parking strategies will increase efficiency and reduce the cost of moving to a parking lot by reducing the number of users who cannot find a parking space. Our system's simulations usually arrive at a good solution when the car manages to find an empty parking space. The average waiting time for shuttles per parking lot will be the shortest and the total waiting time for a car in each parking lot will be reduced. Classification of parking spaces by autonomous search makes it more efficient to park vehicles in public spaces. Searching and classifying parking spaces according to the status of the parking spaces communicating with the microcontroller makes it easy to follow the vehicle's path to the appropriate parking space. The system plans to use the Android app to facilitate user parking and retrieval of vehicles. Our goal is to reduce the number of employees who will park in public places such as shopping malls, public parking lots, and five-star hotels. Therefore, the proposed design will provide a good parking space by using the search method correctly..

REFERENCES

- 1] Lee, Cheng & Leng, Fabian & Ariyaluran Habeeb, Riyaz Ahamed & Amanullah, Mohamed Ahzam & Habib ur Rehman, Muhammad. (2022). Edge computing-enabled secure and energy-efficient smart parking: A review. *Microprocessors and Microsystems*. 93. 104612. 10.1016/j.micpro.2022.104612.
- [2] Santoso, Danny & Hakim, Muhammad & Rachfian, Muhammad & Hidayat, Muhammad & Spits Warnars, Harco Leslie Hendric. (2022). Mobile Application for Smart Parking Systems.
- [3] Ulla, K. (2022). Enhanced Framework for Secure Smart Parking Management. *International Journal for Research in Applied Science and Engineering Technology*. 10. 240-245. 10.22214/ijraset.2022.45255.
- [4] Zou, Yang & Ye, Felix & Li, Angela & Munir, Mustapha & Sujun, Sujesh & Hjelseth, Eilif. (2022). A Digital Twin Prototype for Smart Parking Management.



|| Volume 12, Issue 5, May 2023 ||

| DOI:10.15680/IJIRSET.2023.1205124 |

- [5] Khan, Muskan. (2022). Arduino project for smart parking system.
- [6] Zulfiqar, Haidar &Mahfooz Ul Haque, Hafiz & Tariq, Faiza & Khan, Rashad. (2021). A survey on smart parking systems in urban cities. Concurrency and Computation: Practice and Experience. 10.1002/cpe.6511.
- [7] Veeramanickam, M.R.M. & Venkatesh, B. Bewoor, Laxmi &Bhowte, Yogesh &Moholkar, Kavita &Bangare, Jyoti. (2022). IoT based smart parking model using Arduino UNO with FCFS priority scheduling. Measurement: Sensors. 24. 100524.10.1016/j.measen.2022.100524.
- [8] T. Anusha (2022). Efficient Communication Model for a Smart Parking System with Multiple Data Consumers. Smart Cities. 5. 1536-1553. 10.3390/smartcities5040078.27



Impact Factor: 8.423



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details