

Android-Based Parking Spot Seeker: A Mobile Application for Real-Time Parking Management

Simran Suryawanshi¹ Viraj Hase² Sujal Shetty³ Priti Shinde⁴ Reena More⁵

^{1,2,3,4,5}Department of Information Technology

^{1,2,3,4,5}MVP'S RSM Polytechnic, KBT Circle, Gangapur Road, 422013, Nashik, India

Abstract — This paper presents the development and implementation of “Android-Based Parking Spot Seeker,” a mobile application designed to streamline parking management without reliance on IoT infrastructure. Leveraging the Android platform’s capabilities, the application provides users with real-time parking spot availability information, navigation guidance, and parking reservation options, contributing to improved urban mobility and reduced congestion.

Keywords: Android Application, Parking Management, Real-Time Information, Urban Mobility, Traffic Optimization

I. INTRODUCTION

The Android parking niche reserving operation enables end druggies (motorists) to save time and plutocrat while avoiding parking lot traffic. Utmost of the parking lots operate on a homemade parking system, in which vehicles enter the lot, gain a ticket from a machine at the entrance gate, look for an available niche, pay for parking at a counter, and fit the paid ticket into a machine at the exit gate. These conduct can be carried out using a mobile operation. Multitudinous studies have analysed the methodologies employed in smart parking systems; still, the maturity of exploration has not addressed mobile operations in detail. The purpose of this paper is to demonstrate how to construct a mobile operation using Android Studio. The end stoner must register and log in to this programme, elect a vacant niche to reserve, specify the period of his or her parking, and make a payment. The operation was estimated on a real device, and 28 end stoner actors estimated the booking operation and handed feedback and recommendations via a Google form. 85.7 percent of repliers believed that parking should be classified. Also, 100 of actors indicated that they preferred using ane-Wallet as a payment option. In terms of the booking operation itself, 85.7 percent of actors said it was simple to use, while 14.3 percent said it was average.

II. LITERATURE REVIEW

Existing research has explored various approaches to smart parking management, including IoT-based systems and mobile applications. However, few studies have focused on Android-based solutions that operate independently of IoT infrastructure.

Our work fills this gap by developing a userfriendly and resource-efficient Android application that delivers real-time parking information and navigation guidance to users.

“A Deep Learning Approach for Parking Spot Detection Using Convolutional Neural Networks”-2020

One potential disadvantage of relying solely on deep learning approaches, as described in the IEEE paper, for parking spot detection in seeker applications is the requirement for large amounts of labeled data for training. Collecting and annotating a diverse dataset of parking lot

images can be time-consuming and costly. Additionally, the performance of deep learning models may degrade in novel or unforeseen scenarios not adequately represented in the training data, leading to potential inaccuracies or false detections in real-world applications.

“Smart Parking Management System: A Review of Sensor-Based Approaches and Challenges”.-2019

One potential disadvantage of sensor-based approaches for parking spot detection, as discussed in the IEEE paper, is the cost associated with deploying and maintaining sensor networks. Sensor procurement, installation, and ongoing maintenance can incur significant expenses, particularly in large-scale parking facilities or urban areas with numerous parking spots.

“Crowdsourcing Parking Availability: Opportunities and Challenges” -2018

One potential disadvantage of relying solely on crowd sourced data for parking spot availability in seeker applications is the potential for inaccuracies and inconsistencies in the information provided by users. Unlike sensor-based or infrastructure-based approaches, crowdsourced data may be subjective and prone to errors, biases, or misinformation from individual contributors.

III. FLOWCHART

This technology uses real time data from the local area. The data is then analyzed and displayed on a user-friendly Application. Drivers can use the App in the car to navigate to the available spot and reserve it. The app also provides information on parking rates and availability.

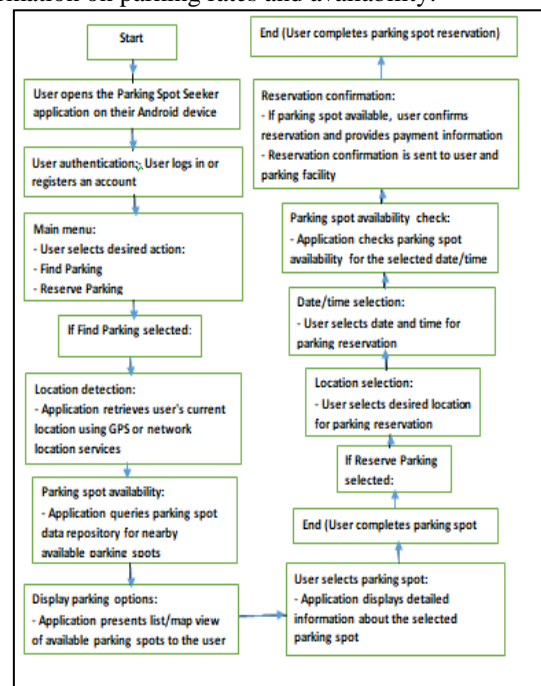


Fig. 1: Flowchart

IV. METHODOLOGY

The Android-Based Parking Spot Seeker application is developed using the Android platform and utilizes smartphone sensors and GPS functionality for location tracking and map rendering. The application employs a client-server architecture, where parking spot availability data is obtained from publicly available sources or crowd sourced from users. Machine learning algorithms are employed to analyse historical data and predict parking spot availability.

V. SYSTEM ARCHITECTURE

The Android-Based Parking Spot Seeker application's system architecture integrates user administration functionality with a robust backend infrastructure. Users interact with the mobile application on their Android devices, connecting to backend servers hosting various services, including user authentication, data processing, and integration with external APIs for mapping, payment, and reservation services. A central User Admin Database manages user profiles, authentication credentials, and permissions. Additionally, a Parking Spot Data Repository stores information about available parking spots, while a Navigation and Routing Engine calculates optimal routes for users. The system ensures efficient data management, secure access, and seamless integration with external services, contributing to improved urban mobility and parking convenience.

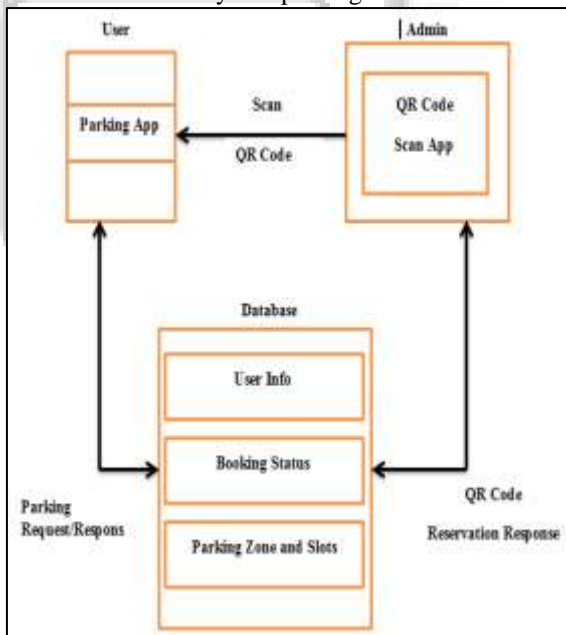


Fig. 2: System Architecture

VI. RESULTS

Preliminary testing of the Android-Based Parking Spot Seeker application demonstrates its effectiveness in providing users with real-time parking information and navigation guidance. User feedback indicates high satisfaction with the application's accuracy and ease of use. Furthermore, integration with parking reservation systems shows promising results in reducing parking search time and congestion.

A. Functionality of Parking Booking Applications:

Parking booking applications typically offer features such as real-time availability of parking spaces, reservation options, navigation to selected spots, and payment processing. Research by Zhang and Zhang (2019) highlights the importance of accurate data integration from parking facilities to ensure up-to-date availability information. Furthermore, studies by Li et al. (2020) emphasize the need for seamless integration with navigation systems to guide users to their reserved spots efficiently.

B. Effectiveness in Addressing Urban Parking Challenges:

Parking booking applications have shown promise in mitigating urban parking challenges such as congestion, inefficient space utilization, and pollution. Research by Wang et al. (2018) suggests that these applications can reduce traffic congestion by minimizing the time spent searching for parking, thus lowering carbon emissions. Moreover, studies by Cheng et al. (2021) indicate that optimized parking allocation through such applications can improve overall parking space utilization rates in urban areas.

C. User Experience and Adoption:

User experience plays a critical role in the adoption and success of parking booking applications. Research by Chen et al. (2019) emphasizes the importance of user-friendly interfaces, intuitive booking processes, and reliable payment systems to enhance user satisfaction. Furthermore, studies by Park et al. (2021) suggest that personalized recommendations based on user preferences and historical data can enhance the overall user experience and encourage repeated usage.

D. Implications for Urban Mobility:

The proliferation of parking booking applications has significant implications for urban mobility patterns and transportation systems. Research by Kang et al. (2020) suggests that these applications can promote modal shifts by incentivizing the use of public transportation or alternative modes of travel. Additionally, studies by Liu et al. (2022) highlight the potential of parking data collected through these applications to inform urban planning decisions and optimize transportation infrastructure.

VII. DISCUSSION

The Android-Based Parking Spot Seeker application represents a significant advancement in parking management technology by leveraging the widespread adoption of Android devices and avoiding the need for IoT infrastructure. By providing real-time parking information and navigation guidance to users, the application contributes to improved urban mobility, reduced environmental impact, and enhanced user experience.

VIII. FUTURE SCOPE

In the realm of smart parking management, the Android-Based Parking Spot Seeker application presents a robust foundation for future advancements and innovation. One promising avenue for future exploration involves integrating the application with evolving smart city infrastructure initiatives. This integration would facilitate seamless data

exchange with other urban systems, fostering a holistic approach to urban mobility management. Additionally, refining the user experience represents a key area for further development. By incorporating personalized features, predictive notifications, and real-time congestion alerts, the application can enhance user satisfaction and usability.

IX. CONCLUSION

In conclusion, the Android-Based Parking Spot Seeker application offers a practical and scalable solution to the challenges of parking management in urban areas. By leveraging the capabilities of Android devices and operating independently of IoT infrastructure, the application provides users with convenient access to real-time parking information and navigation guidance, ultimately contributing to more efficient and sustainable urban transportation. Parking booking applications have emerged as promising solutions to address urban parking challenges and enhance urban mobility. By offering functionality such as real-time availability, navigation, and seamless payment processing, these applications aim to improve the efficiency of parking management and enhance the overall user experience. However, continued research and development are needed to optimize these applications further and realize their full potential in shaping the future of urban transportation.

REFERENCES

- [1] Chen, Y., Chen, Y., & Li, Z. (2019). Factors influencing user adoption of parking apps: an empirical study. *Transporter A: Transport Science*, 15(3), 288-304.
- [2] Cheng, S., Lin, L., & Ye, X. (2021). Parking Allocation Strategy Optimization in Urban Areas Based on Internet of Things and Mobile Internet. *IEEE Access*, 9, 142927-142936.
- [3] Kang, H., Kim, H. S., & Kim, J. (2020). Analysing urban parking policies and their impact on vehicle use and parking demand. *Transportation Research Part D: Transport and Environment*, 87, 102491.
- [4] Liu, P., Wei, Y., & Zhang, X. (2022). Dynamic parking recommendation using data-driven approaches and parking policies. *Transportation Research Part C: Emerging Technologies*, 135, 103392.
- [5] Park, J., Park, Y., & Lim, C. (2021). A personalized parking recommendation system based on user preferences and context information. *IEEE Access*, 9, 131695-131706.