


Chapter 7

AUTOHAUS: An Optimized Framework for Secure and Efficient Parking

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ABSTRACT

In this chapter, an optimized parking framework, AUTOHAUS, is presented that focuses on three aspects (i.e., automation, security, and efficient management of parking space). A combination of advanced technologies is used to design the proposed framework. AUTOHAUS provides two ways of security implementation such as authorized QR codes and OTPs (one-time passwords). Furthermore, for efficient management of parking spaces, the still images of the front and side view of the car are used to extract the license plate and size of the car for effective allotment of parking space based on the size of the car. This proposed system can reduce human effort to a great extent and can also be used as a path-breaking technique in parking and storage management.

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INTRODUCTION

Nowadays there is a tremendous rise in the automobile industry and the need for an efficient and secure parking system is of great concern today. This great increase in this industry has led to an abundance of cars which leads to a shortage of parking spaces (Jusat et al., 2021). There are various automated parking systems available, but none of those systems has the ability to manage space efficiently (Mathijssen & Pretorius, 2007); (Serpen & Debnath, 2019). Hence, there is a need for a mechanism that will replace the current system which doesn't have the ability to manage special resources. The current automated parking systems have shown a great deal in the evolution of automation technology but technology can always be optimized and improved (Pala & Inanc, 2007). Seeing these current systems and the issue of the decreasing parking spaces, a solution comes to light that is based on the type and the length of the car these spaces and can be efficiently managed and utilized. Also seeing today's users are very convenient using mobile devices for everyday tasks. The integration of the parking system with mobile device brings additional functionality to the system which not only provides ease of access to the users by finding the parking system and automatic payments, but it can also provide a layer of security that only the mobile device will be able to control the entry and exit of the car from the system.

Motivated by the mentioned problem domain and through the development of new technologies, here an efficient and automatic parking model is presented, where two main parameters are presented i.e., security of cars and the efficient use of parking space. When the car enters the parking system based on its type and size a parking spot is assigned to the car, this is based on the theory that three small cars take up almost the same space as two sedan cars. Furthermore, with this, some security features are also implemented and an app was developed to speed up the parking process.

This proposed framework is a solution to various parking problems that a man faces daily, first it caters to the biggest problem of efficient parking spaces which is a major concern in today's world, especially where there is a scarcity of space. Secondly, the system's interface has two options for making an entry which includes scanning of the QR code option for the user who has a mobile app pre-installed, in this option the user has to just scan the QR, and the rest is done automatically at the system's end, and at the time of existing user just has to show the generated code at mobile in the system for the successful exit. The second option is for the user who doesn't have the mobile application installed on their mobile device, this is option is an OTP password system an OTP (One Time Password) is sent to the user's mobile number and the user has to enter the password at the time of entry, and at the time of exit, the user has to put in another password sent to the same mobile device to

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