

Study on Intelligent Parking Management System for Alleviating the Effect of Urban Parking

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Abstract

With the accelerating process of urbanization in our country, the living standard and economic strength of the people are constantly increasing, and the proportion of private cars continues to grow. At the same time, the rare problem of parking is particularly prominent. The resources of urban parking facilities are limited. In view of the serious problem of parking difficulties, intelligent parking industry is an effective way to improve the efficiency of parking in existing cities and alleviate the problem of parking difficulties. The development of intelligent parking industry is an effective way to speed up the process of urban development to alleviate parking difficulties.

Keywords

Parking difficulty; Intelligent parking management system; Intelligent parking technology.

1. Introduction

In recent years, with the improvement of urban residents' living standards and the increase of residents' travel distance, the number of cars is increasing year by year, the supply and demand of urban parking is seriously out of balance, and there are many serious problems in the existing parking lot. The reason is that the existing backward parking facilities are difficult to provide users with real-time and dynamic parking information and intelligent and convenient toll management. As a result, many parking users can not accurately get the parking information, resulting in a lot of useless parking, so that parking difficulties, traffic jams and parking contradictions emerge in endlessly [1]. For these situations, the intelligent parking management system is effective To alleviate the problems in urban parking, through the scientific construction of urban intelligent parking management system, the development of intelligent parking technology, the provision of real-time and efficient parking information services to alleviate the problem of urban parking difficulties and low parking efficiency.

2. The Current Situation of Urban Parking

The problem of difficult parking in cities is common in all major cities. In recent years, with the rapid development of economy and the rapid progress of urbanization, urban traffic development has also entered a new era, urban road construction has developed rapidly, and the level of urban transportation services has been significantly improved. by the end of 2018, the number of cars owned by the country exceeded 200 million, an increase of 10.51 percent over 2017. In 2018, the number of private cars reached 189 million, with an average annual increase of 19.52 million in the past five years. The increase of car ownership year by year has undoubtedly caused great pressure on urban parking, and the problem of parking difficulty is becoming more and more prominent. Among them, the low efficiency of parking in the parking lot is the cause of the city. The important factors of city parking difficulty, especially in large shopping malls, residential areas, hotels, hospitals, low parking efficiency and then lead to

traffic jams one after another, in this efficiency era, seriously affected people's efficiency. Causing traffic inconvenience, affecting people's travel mood.

3. Intelligent Parking Management System

With the increasingly serious problem of urban parking difficulties, the previous human parking lot has been unable to meet the actual demand, and there are still many problems in the human parking management system, so the introduction of intelligent parking system is urgent. Intelligent parking lot should meet the diversified needs, intelligent parking lot is mainly aimed at parking customers. For parking customers, the parking space problem, reservation problem, safety problem, charging problem and so on will be considered [2], so the intelligent parking management system should cover these aspects.

The intelligent recognition system is the core of the intelligent parking system, the intelligent identification system is mainly the identification of the parking space and the license plate, the automatic identification of the parking space and the automatic identification of the license plate are the exit, the entrance and the parking space of the parking lot, The driving dynamic key point uses the tracking recognition technology to realize the integration of the license plate recognition[3]. by using the scientific license plate recognition algorithm, the accuracy rate and the recognition rate of the intelligent vehicle identification are more than 99 percent, and the vehicle/ parking space automatic identification technology can accurately and intuitively present the remaining amount and the position distribution condition of the parking space in the parking lot in the front of the parking user, and a parking space can be carried out in the automatic identification system of the vehicle and the parking space, The reservation and automatic control of the parking lot, the VIP parking area in the parking lot, the VIP owner can book the parking space online through the mobile phone client [4], to avoid the situation that the car is full of nowhere to park, and for the owner of the long-term parking vehicle to implement the parking coupon policy, that is, sweep the code to download the parking lot Mini Programs, carry on the recharge daily will have the voucher activity, This can not only make full use of the parking lot, but also reduce the parking cost of the majority of users [5].

4. The Function of Intelligent Parking Technology

4.1. The Technology and Function of Intelligent Parking Recognition

The intelligent parking system is based on the support of the intelligent parking technology, the intelligent parking technology is the core of the whole intelligent parking system, only the support of the intelligent parking technology can enable the intelligent parking system to operate normally, so, Intelligent parking technology plays an important role in relieving the low efficiency of urban parking. The following is a few aspects of the smart parking technology and its role. Intelligent recognition technology is the most basic and important technology of intelligent parking technology. Vehicle automatic recognition technology has been greatly improved compared with the previous parking management mode of manual card. Intelligent recognition technology includes the recognition of vehicle type and license plate, in which the key technologies include image processing, and image processing includes image acquisition, preprocessing, feature extraction, recognition and generation [6]. For license plate recognition, in addition to image processing, license plate location and license plate number character segmentation, through the debugging of the algorithm to complete the recognition. The development of intelligent identification technology greatly shortens the time for vehicles to enter and leave the parking lot and improves the parking efficiency. Is the most critical part of intelligent parking management system.

4.2. Intelligent Parking Guidance Technology and Function

The intelligent parking guidance technology plays an important role in the operation of the whole parking lot, in which the distribution and the layering of the induced information play a critical role in the parking-inducing effect, and the too complex or hidden-induced information can increase the reaction understanding of the driver and find the time of the parking space, so, The simplicity and location of intelligent parking-induced information is an important factor to alleviate traffic congestion in the parking lot[7]. For open parking, the entrance should have a clear parking-induced information board to display the parking space The remaining amount of the “zero” is displayed if there is no vacancy. After entering the parking lot, the front end of each row of parking spaces shall be provided with a parking display card to display the remaining amount of the parking space and the parking space number of each row, and the parking space of the “one-stop” is used for parking the parking spaces in an irregular open-air parking lot, that is, the vehicle is running along a road when the vehicle is driven into the parking lot, if there is a parking space, There is a need in such a parking lot to drive the vehicle into and out of the vehicle-specific travel path. For the mall or residential area where the traffic volume and the person’s flow are large, the open-air parking lot shall be combined with the underground parking lot, and the parking lot shall be marked with obvious parking marks at the entrance and the number of remaining cars shall be displayed. When the vehicle enters the underground parking lot, each area has a parking-inducing card to display the remaining car number and the spare parking space number, and a specific induction board is arranged beside each area to indicate each parking space number, so that the parking user can conveniently find the spare parking space, Avoid wasting time looking for parking as it is not clear. The method of combining the open parking lot and the underground parking lot can improve the utilization rate of the parking lot, And the densely populated residential area is a good choice.

The intelligent parking guidance technology plays an important role in improving the parking efficiency and reducing the parking difficulty of the city, and helps to stop the parking. The user is informed of the real-time parking situation of the parking lot, so that the external parking user can find the parking space in the shortest time without being familiar with the path and improve the convenience and safety of the parking. The development and perfection of the intelligent parking guidance technology also plays an important role in the development of the whole parking industry, and provides technical support for the current situation of the difficult parking of the city[8].

4.3. Intelligent Parking Charging Technology and Its Function

Intelligent parking toll collection technology plays a very important role in the parking lot management system, and efficient toll collection system is also an important factor to promote the development of parking system management. Intelligent parking toll collection technology is mainly through the central manager of the management system, the imported vehicles are identified and then the real-time tracking and timing charges are carried out through the guidance technology. Through the introduction of the intelligent parking system, we can know that although the charging system of the intelligent parking lot is intelligent and automatic timing charging, the manual charging mode still hinders the improvement of the charging efficiency. The low efficiency of the manual charging system often leads to a long queue at the exit toll collection office of the parking lot. The introduction of the self-service intelligent parking charging system is very important for the entire intelligent parking lot. At the same time, the intelligent toll collection system is also an important part of the whole intelligent parking management system. The meter is more popular in the city's road. The parking is convenient for the vehicle owner to stop at the roadside, so that the roadside parking is more intelligent and more effective management, the occupation time space of the motor vehicle to the lane is reduced, the roadside parking is more scientific and reasonable, and the existing roadside parking phenomenon has good regulation and demonstration effect. However, the

meter is more suitable for parking in the road, and is not applicable to large parking lots, and the meter High cost, high penetration rate and the current level of science and technology still need to be further improved, so it can not be well popularized [9].

For the road parking lot and underground parking garage, in order to solve the problem of low efficiency of manual charging, the general implementation of intelligent parking charging technology has greatly slowed down this problem. For open-air parking lots, the parking lot has been set up exits in different directions, and multiple self-payment terminals are set up at the pedestrian exit of each parking lot, allowing users to use cash, bank cards, Alipay, WeChat and parking coupons to pay. For temporary parking users can enter the license plate number to pay fees, share the payment pressure of the entrance and exit, and improve the speed of passage. For underground garages, set up self-help payers around the garage, not just vehicles Exit a payment window, which in most cities in China's underground parking lot has also been implemented. These new payment methods and payment terminals are more convenient than the previous single manual charge, which alleviates the difficulty of charging and appearing in large parking lots. The intelligent parking charging system effectively alleviates the vehicle congestion caused by manual charging, improves the capacity and efficiency of parking lots, and makes urban parking convenient and efficient.

5. Summary

Through the discussion of intelligent parking management system and intelligent parking technology, the development of intelligent parking technology plays an important role in alleviating the problems of low efficiency and difficult parking in urban parking. For intelligent parking technology, intelligent parking charging technology, intelligent parking guidance technology and intelligent identification technology, there are only three aspects. At present, there are still some technical problems in intelligent parking technology. To ensure the normal operation of intelligent parking system, for intelligent parking technology, it is necessary to combine the static and dynamic information of traffic in the future development, comprehensively analyze all kinds of traffic information, so that the modern intelligent parking technology can share the data. The collection and processing of information, the monitoring and control of illegal parking, parking guidance and information services have all made great progress, in order to further alleviate the current situation of urban parking difficulties.

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