Review of the Vehicle Detection System for No Parking

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Abstract

Parking management becomes more difficult as cities get busier and cars increase. This Paper focuses on creating a smart parking system to regulate vehicle access and stop illegal parking.Our method uses ultrasonic or infrared sensors, a servo motor, and a buzzer to prevent unauthorized parking, in contrast to current systems that just provide parking availability. If someone parks a car in a restricted area the siren might go off, if the siren is still on then it sends an SMS notification to the traffic police via a GSM module. It is important to note that a camera will take an image of the car, save it to Google Drive, and include the link when sending the SMS for better policing.

Keywords: Ultrasonic Sensors, IR Sensors, GSM Module, Servo Motor, Vehicle Detection, Traffic No-Parking Area, Traffic Enforcement, Vehicle Access Control, and IoT Controlled Parking System.

1. Introduction

The widespread challenge of locating a parking space is drastically increasing in metropolitan regions. This is especially true for congested places such as malls, hotels, and cinemas. Traditional forms of parking tend to waste drivers' time, lead to excess fuel consumption, and negatively impact the environment by contributing to various forms of pollution. Drivers searching for spaces often tend to forget the fact that the normal parking system does not stop illegal parking, which further complicates the problem they are desperately trying to solve.

This paper presents a No-parking vehicle detection system aimed at improving parking surveillance and security. To mask off limited areas for parking, sophisticated modern technologies such as ultrasonic or IR sensors can be installed to trace the entrance of vehicles in restricted no-parking zones. After the sensor gets triggered due to unauthorized parking, it sends an alert notification to the control center via a configured GSM module, establishing communication with the authorities. Images of the vehicle that has violated the parking rules are taken by the camera, and these images are automatically stored in the cloud to serve as evidence of violation for enforcement purposes.

In addition to increasing the effectiveness of handling parking infractions, this integrated approach helps to lessen emissions, traffic congestion, and unlawful parking in restricted areas. The system improves urban living conditions and saves drivers time by automating these tasks, which is in line with the larger objectives of smart city initiatives.

2. Literature Review

1) Ghosh et al. [1] describe an Internet of Things (IoT)-based smart parking system that uses ultrasonic sensors to identify and notify users when someone parks illegally in designated areas. The study emphasizes how IoT can be used to monitor in real time, increase enforcement effectiveness, and more successfully handle parking infractions.

2) To monitor and control no parking zones in real time, Sharma et al. [2] investigated the integration of cloud computing and Internet of Things devices. Sensor networks in their suggested system identify unauthorized vehicles and send data to a cloud server, which analyzes the data and sends traffic authorities alerts. The study emphasizes the potential of cloud-based solutions for effective traffic management and enforcement, highlighting their scalability and adaptability for large-scale urban deployments.

3) An IoT-enabled framework for identifying and stopping infractions in no-parking zones is proposed by Akhtar et al. [3]. The system automatically takes pictures of unauthorized vehicles and monitors restricted areas by integrating sensors, cameras, and GPS technology. Enforcement agencies receive notifications after the intercepted data is processed on a central server. The study emphasizes how IoT could enhance parking enforcement systems' precision and dependability.

4) The creation of a parking and number plate recognition system is covered by Kumar et al. [4], who published their work in the International Journal for Research in Applied Science & Engineering Technology (IJRASET) in 2018. This study introduces a parking system management and vehicle license plate (VLP) recognition application that may find use in Nepali border crossings, parking lots, and traffic control.

5) In their 2023 article for the International Journal for Research in Applied Science & Engineering Technology (IJRASET), Shah et al. [5] describe a novel image processing method for identifying cars parked in no-parking zones. Intending to enhance urban mobility and lessen environmental effects, this creative solution tackles illegal parking in urban areas, which exacerbates traffic congestion and environmental problems.

3. Existing Work

Managing parking spaces in cities has become more difficult as a result of the increasing number of cars and the ongoing urban population growth. Unauthorized parking in no-parking zones is a major problem for traffic management authorities and urban planners because it impedes traffic flow, decreases the number of available parking spaces, and jeopardizes public safety. Although they offer basic information about available parking spaces, traditional parking management systems frequently fall short in their ability to efficiently monitor and enforce no-parking policies. The problem of cars parked in unapproved zones is not sufficiently addressed by current solutions, which results in ineffective parking management and enforcement. Significant difficulties arise from the absence of a reliable, automated system to identify and address unauthorized parking:

1) *Ineffective Enforcement:* Manually enforcing no-parking rules takes a lot of time, and resources, and is prone to delays, which reduces their ability to deter infractions.

2) *Lack of Visual Evidence:*It can be challenging for traffic cops to obtain enough proof to impose fines, which makes it hard to hold offenders accountable.

A sophisticated smart parking system is required to address these issues. It must actively monitor no-parking zones, identify unauthorized vehicles, and enable effective enforcement through automated alerts and visual development. It must also direct drivers to available parking spaces. The goal of this project is to create a smart parking system that combines automated alert systems, a camera-based evidence collection system, and real-time sensor-based detection of unauthorized vehicles. By strengthening the enforcement of no-parking laws, the solution will improve urban safety, traffic control, and parking efficiency in general.

4. Proposed Work

The networking of physical objects with electronics integrated into their design to facilitate communication and the detection of interactions between them or with their surroundings is known as the Internet of Things (IoT). In the coming years, IoT-based technology will offer better services, essentially changing how people live their daily lives. Improvements in the fields of medicine, electricity, agriculture, smart cities, and smart homes are just a few areas where IoT is well established. There are currently over 9 billion "Things" connected to the Internet. The ability of the Internet of Things (IoT) to link devices and enable seamless collaboration has completely changed the world. Innovative solutions to problems in the real world can be developed using the Internet of Things. Because people continue to park their cars in undesignated spots, we have developed a module that uses servo motor buzzers, ultrasonic sensors, or infrared sensors to identify vehicles parked in undesignated parking spaces.

5. Conclusion

In today's cities, effective parking management is a major concern due to the fast urbanization and rise in the number of vehicles on the road. Conventional parking systems are ineffective at controlling illegal parking in no-parking zones, even though they address certain aspects of parking availability. This disparity emphasizes the need for a more sophisticated system that not only notifies drivers of parking spaces that are available but also instantly enforces parking laws. This problem is addressed by the smart parking system created in this study, which combines a number of technologies such as servo motors, buzzers, GSM modules, ultrasonic sensors, and infrared sensors. This system efficiently identifies unapproved cars in no-parking zones and starts a sequence of automated actions, such as setting off alarms and sending an SMS to the appropriate traffic authorities. By offering visual proof of parking infractions, the camera feature expands the system's functionality even further. The system guarantees accountability and transparency while also enhancing the enforcement process by automatically taking and uploading pictures of illegal vehicles to Google Drive.

To sum up, this study's suggested smart parking system provides a thorough answer to the problems associated with illegal parking in cities. The system greatly enhances parking management and enforcement by fusing automated alerts, real-time detection, and visual documentation, resulting in safer and better-organized urban environments. This strategy opens the door for parking solutions that are more scalable, secure, and able to change to meet the changing demands of contemporary cities.

6. References

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