Automatic Unauthorized Parking Detector with SMS Notification

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Abstract:

The main objective of this paper is to identify the unauthorized parker who were parked in the authorized area and fine those owners. This is used to avoid the illegally parked vehicle, bribing the personnel and threatening them etc. In here we used the RFID tag, which contain some information. The RFID is stands for Radio Frequency Identification. The RFID reader is used to read the transmitted ID and if the person id is not match then automatically the alert information is send to the owner by the SMS notification. This is an innovative electronic parking payment system. This may use to produce a solution for the municipalities, and the private parking lot owners. By using the RFID technology the solution has been provided for encountered in the parking-lot management system.

Keywords: Atmega Microcontroller, RFID Module, GSM, Crystal Oscillator

I. INTRODUCTION

The parking violation is the act of parking the vehicle in the unauthorized place or parking in a restricted area. The current scenario in major cities and towns is the evergrowing human population as well as the vehicle population. Those things creates the rise to need for the multi-level parking lots. The free parking is the most prevalent forms of parking in India. In case the people planned to park in the street side but there is no vacant places, the people drive around hunting for the place. Especially in the metropolitan area there is a problem because of the increase of the cars and the decrease the amount of the free space.

The proposed model will provide a solution to parking space problems and will be able to decrease the number of parking violations. Also, it will render convenient and secured parking places to the car owners, since it is user-friendly, convenient and secured. This can be used for building a smart city, and to reduce traffic congestions in large cities. It can stop illegal parking. The automatic unauthorized car parking detector can also be used in private parking lots, housings, apartments, hospitals, municipalities, etc. to provide secured as well as legitimate parking places.

II. LITERATURE REVIEW

Various methods are prevalent for development of autonomous or intelligent parking systems as well as illegal parking detectors. One intelligent system for car parking has been proposed by making use of image processing in parking space detection system [1]. In this system, an image of the parking slot is captured and processed to detect whether the slots are free or not. The seven segment displays show the number of currently available parking lots in the parking area. The limitations in the system are the type of camera used, the coordinate system used, and camera needs to be placed at a fixed location. Another automatic parking system and electronic parking fee collection system has been developed and implemented, which is based on vehicle number plate recognition [2]. This system has less human interactions with no use of magnetic card and its devices. In addition, it has parking guidance system to guide users towards parking spaces. The system recognizes number plates for parking and billing by using image processing. The license plates are extracted from car images, which are followed by segmentation of characters and reorganization. Electronics for parking fee collection has been developed based on the number plate information. Limitations with this system include background colour, which is compulsorily black and character colour is white. Also, analysis is limited to the number plates in only one row. A smart car parking system has been proposed, which is commanded by an Android application to regulate the number of cars to be parked in the parking area [3]. This is done by automating the parking and un-parking of the car by commands from an Android application. This reduces the time required for search of free parking space by manually driving through multiple slots. The automation in the car is achieved by path tracing, using sensors. The car is parked at multiple levels by using lift and image processing is used to capture the number plate, which is compared with that stored in a database to avoid illegal entry of cars. A prototype system of smart parking services based on Wireless Sensor Networks (WSNs) has been developed and implemented, which allows drivers to efficiently find the free parking spaces [4]. The system consists of wireless sensor networks, embedded web-server, central web-server and mobile phone application. In each parking slot, low cost WSN modules are used. The state of the parking slot is detected by sensor node, which is reported periodically to embedded web-server by WSN. Wi-Fi networks send this information to central web-

server and the driver finds free parking slots by standard mobile devices. Another RFID and OCR enabled automated system for parking management, which can work efficiently for small to large organizations, has been elucidated in [5]. Here, access control is provided by use of boom barriers and both time and human efforts are saved. At first, the identification of the vehicle is done. If the vehicle is registered in the database, then the corresponding RFID tag is read and the database entry is updated. Vehicles cannot access parking area without being identified and runtime updating of parking places allotment makes it easy to manage parking. After the identification phase, an Optical Character Recognition (OCR) is used to read the number plate of the vehicle. This is done by using image processing algorithms. A similar record is made, when a vehicle leaves the parking slot. In [6], a car is detected by Support-Vector Machines (SVM) and Histogram Oriented Gradient (HOG) algorithms. An SVM performs classification by finding the hyperplane that maximizes the margin between the two classes. The first step is to identify the image. Then, in the next step, zero order and second order gradient are included to increase accuracy of feature extraction. A new vehicle identification system that provides high degree of accuracy and success rates is proposed in [7]. This consists of four stages: license plate detection, license plate recognition, license plate province detection and vehicle shape detection. In this system, the features are converted into local binary pattern (LBP) and HOG as training dataset. For high accuracy in real-time, a novel method is used to update the system. In this system, the vehicles' features and information are stored in the database. In addition, the procedure is able to detect any discrepancy between license plate and vehicles automatically.

III. METHODOLOGY

1. Hardware Setup:

Connect the sensors to a microcontroller (e.g., Arduino) that can process the sensor data.

2. Data Processing:

Program the microcontroller to process sensor data and detect unauthorized parking based on predefined criteria (e.g., duration of parking, specific vehicle ID).

If unauthorized parking is detected, trigger an action to send an SMS notification.

3. SMS Notification:

Integrate a GSM module or use an online SMS gateway to send SMS notifications.

Configure the system to send SMS alerts to the owner's phone number when unauthorized parking is detected.

4. Owner Registration:

Implement a registration system where the owner can provide their phone number to receive notifications.

Store owner information securely to ensure privacy and security.

5. Testing and Validation:

Test the system thoroughly to ensure accurate detection of unauthorized parking and reliable SMS notifications.

Validate the system's performance under various conditions (e.g., different lighting, weather).

6. Deployment and Maintenance:

Install the system at the desired parking location.

Regularly maintain and update the system as needed to ensure continued functionality and security.

7. Optional Enhancements:

Implement a web or mobile interface for owners to remotely monitor parking activity and receive notifications.

Integrate with security cameras for visual confirmation of unauthorized parking events.

Add features such as automatic license plate recognition for more precise identification of vehicles.
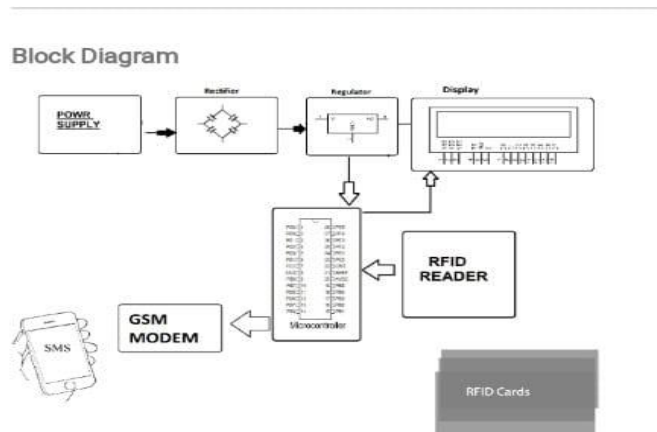
IV. FIGURE

Fig.1 Block diagram of the system

V. CONCLUSION

With RFID car parking system which is used to develop the automated parking system the vehicle will be park without the presence of the security office. By checking the id proof for the user, if an unauthorized access in the car parking area the alarm will be enable automatically. Therefore this is used to reduce the waiting time for the parking area and this may increment the utilization of the parking lot.

VI. REFERENCES

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