Logo

Description automatically generated

SMART PARKING SYSTEM

**ABSTRACT**

Finding a parking place has always been a challenging issue, and many individuals have been experiencing it in recent years. Due to the few and dispersed parking places, it is difficult to park quickly, and time is lost by having to drive around in circles to find a parking spot. Unfortunately, this is a widespread issue in parking lots around the country. Our objective is to propose a real-time, smart parking system that can precisely measure the number of available spots in each lot and make educated forecasts about future parking circumstances based on historical parking data. A reactive web application would make this information readily available. This information is also stored in database securely which can be used for future predictions and as a proof to the police if any misuse of the system.

**INTRODUCTION**

There are many automobiles owned by people today. Due to the enormous number of automobiles, parking a vehicle in public locations is quite inconvenient. The time spent hunting for parking increases carbon emissions directly and time can be saved greatly if we can find parking spots sooner than expected [2]. Cars that move at lower speeds emit significantly more carbon dioxide. So, an automatic parking system that displays the availability of open parking spaces in any lane immediately at the entry and an Automatic number plate recognition (ANPR) is required for monitoring user actions. The tool will evaluate availability of parking space thru object detection and image processing to detect text. Image data from parking lots are gathered and stored in a file system and will be used for processing using object detection libraries and put into prediction algorithms, which utilize historical and current data to identify parking availability in present and to forecast the patterns of availability for the future usage. The processed results are stored to database securely. The results from the database are communicated to the app and shown to the users as a future forecast and the ANPR Localizes plates in photos and reads license plate numbers using Optical Character Recognition (OCR). The captured plate numbers are matched to the parking permit database, and any infractions are reported to the police department and the car owner, thus it eliminates the misuse of system. The data is gathered directly from the cameras that are installed in any parking lots with approved permissions then the data will be pre-processed and stored.

**Related Work:**

The method works on the first-come, first-served basis and it’s a time-space problem where each motorist will be granted a certain amount of time to park their car, which will be determined by the distance between them and the parking lot. In one article, an IoT gadget is used to tackle the problem of automobile parking in metropolitan areas. They do this by using an infrared sensor on a Wemos D1 microcontroller to identify vehicles leaving or entering a parking lot. The primary goal of this project is to aid users in locating available parking spaces, thereby saving time and gasoline. This solution has the potential to reduce or eliminate the time management issue at the parking lot, since users can save time by checking available parking slots in advance via the online application [4]. Although this work is very similar to our idea to solve urban parking difficulties with a management and routing system that will be displayed on a web application, their work is not scalable because the parking lot utilized for testing only has one entrance/exit. This will be challenging if parking lots are dispersed across the area, with one-way and two-way entrances and exits. The other project [6] proposes a parking lot availability tracking system. This is accomplished by installing Internet of Things (IoT) devices in each parking spot that monitor and report whether or not the space is occupied. For a few reasons, this project seemed worth looking into. For starters, their gear (dubbed the SPIN-V) performed a variety of valuable jobs. It employed sensors to see if a car was parked in the area and scanned the license plate of the vehicle. This data was relayed back to the control server, which updated statuses on a mobile app and double-checked that the car was actually there. There are a few more IoT initiatives similar to ours. Each project had its accomplishments, but there were certain areas that needed to be improved. An IoT-based solution will necessitate the installation of additional infrastructure. To monitor a whole parking lot, systems based on hardware and sensors in each parking place are an expensive approach. This raises the issue of hardware deterioration due to exposure to the environment (in outdoor parking lots), as well as the necessity to install cables and wires to each parking place.

In 2018, a group of academics from the International Journal of Research and Analytical Reviews released a study on parking charge automation (IJRAR). To scan license plate numbers and distribute fines, the researchers used an Automated (Car) Parking System (APS). The organization installed cameras at a parking facility's entrance and exit with the objective of scanning and identifying license plates and then computing a price based on entry and exit time [1]. Java was used to turn the license plates into text data. This content was then written to a MySQL database row, which included information such as entrance and exit times. This strategy reduced staff participation in ticket/fee distribution, was extremely practicable for the group to implement, and protected against automobile damage through license plate tracking. However, after a car has entered a parking lot, this technology did not assist prevent against thefts or suspicious activity.

Proposed System:

