

Smart Parking Assistance by Nameplate Recognition using OCR

A. Sharathkumar¹, S. Sudharsan¹, S. Sathish¹, Mageshwari²

¹Student, Department of Computer Science, Anand Institute of Higher Technology, Kazhipattur, India

²Assitant Professor, Department of Computer Science, Anand Institute of Higher Technology, Kazhipattur, India

Abstract — The main scope of the project is to develop a software to process the given image, process the image and extract the Number Plate Information in the form of alpha numeric characters. Input to the program is in the form of an RGB (Bitmap) image file. The input image is assumed to be from an imaging source and is noise free as well as clear. This project assumes a standard number plate scheme of the form “AA NN BB MMMM”. The input image is first oriented to the correct alignment by calculating the pixel gradient and using Sobel Operator. It is then converted to gray scale by using the pixel color averaging algorithm and them mapped to a standard template size using scaling transformation. Otsu's thresholding algorithm is applied on this resultant image to improve the contrast between the adjacent pixels. Since the format of the number plate is known and fixed, each of the character segments are identified based on the segmentation technique and processed to match with the list of character repository using the simplified Canny's edge detection algorithm and comparison techniques. All the character in each of the segment are identified and augmented in order to get the final name plate identification code. This identified number plate number can be linked up to the data base and put for immense applications like mustering of vehicles in the high security zone, electronic toll collection system, monitoring the movements of vehicles in parking sector, effective parking space management system, Mustering of vehicles in the transport corporation depot and so on.

Keywords: Sobel Operator, Otsu's thresholding algorithm, Canny's edge detection algorithm .

1. INTRODUCTION

To develop a software to process the given image, process the image and extract the Number Plate Information in the form of alpha numeric characters and it stored in database. After they enter into lot the number plate of the vehicle is processed and verified with the already existing repository. If found, the vehicle is assumed to be authorized, else it is unauthorized and based on the space available, particular lot is provided to the user to park their vehicle. Parking charges are free for authorized vehicles and the non-authorized ones are charged depending upon the time the vehicle is parked. In today parking lots there are no standard system to check for parking spaces. The system heavily relies on human interaction with the physical space and entity.

This leads to wastage of human manpower and also parking spaces at times. These parking lots are dependent on Human-to-Human Interaction (HHI) which is not efficient. Previously, various techniques have been proposed to overcome such problems. Smart parking with help of short messaging service(SMS) was devised to provide an entry and exit password which would allow the person to authenticate himself/herself at the entry/exit point. The ZigBee wireless sensor network along with global system for mobile (GSM) used a data from each node to show if the parking space is available and the data was available only at the entry point and at the administration end.

The new system with global positioning system (GPS) which helped user to locate parking space remotely. The sensors however, could not be stacked over one another. Artificial Intelligence (AI) provided a background for image processing using camera sensor which helped identify occupied parking spaces to the administrator. The system which works with passive radio frequency identification (RFID) tags which helps identifying individual cars and then booking a slot at the entrance. The image shows how the system works. The presents an idea to use wide angle camera as a sensor which will read only free parking spaces and records them.

They are marked with grey spots on the screen. These records are then used to assign parking space to the incoming user. Intelligent Transport System (ITS) and Electronic toll collection (ETC) using optical character recognition (OCR) creates a record for all entering vehicle. A universal OCR algorithm is not available, making it difficult to create said records. The author proposes robotic garage (RG) using Bluetooth to park the car.

The system identifies the unique registration number in the Bluetooth chip to check whether the new vehicle needs to be parked. This system is a stack parking arrangement for the vehicles with sensors that confirm placement of the car. Other sensors are used to confirm that there are no passengers in the vehicles and then the system moves the vehicle to storage area employing rack and pinion (Rap) mechanism. The author proposes upgraded system to the above, which is deployed with active radio frequency identification (RFID) to authenticate at the gate management service (GMS) to assign a slot. The system provides an additional feature to monitor parking lot over the internet. The author proposes mixed-

integer linear programming (MILP) along with Driver request processing center (DRPC) provides infrastructure to vehicle (I2V) communication for assigning and reserving parking spaces using smart parking allocation center (SPARC) from parking guidance and information(PGI).

Car parking is the main factor adding to congestion problem. Efficient parking management is needed in a developing country. Major issues related are that people park vehicles on sides of the road as there are no enough parking spaces available. The present parking spaces are not maintained properly. The users are not guided efficiently to park the vehicles. They need to search for a free slot to park their vehicle. These problems finally end up with traffic congestion, fuel consumption, pollution, wastage of energy and time. Many techniques are being examined to solve these parking issues. Some of the factors contributing to an efficient parking assistance are the usage of different technologies, system complexity, scalability and cost.

2. EXISTING SYSTEM

Existing efforts at addressing the problem of parking spot information fall short in several aspects. Collecting and maintaining current parking sign data on a global scale has not successfully been accomplished. The only way to collect the parking sign data is to travel down every street of every city to capture the parking sign data. This is because cities do not actually possess the parking sign data in enough detail regarding location of parking meters.

3. PROPOSED SYSTEM

To develop a software to process the given image, process the image and extract the Number Plate Information in the form of alpha numeric characters and it stored in database. After they enter into lot the number plate of the vehicle is processed and verified with the already existing repository. If found, the vehicle is assumed to be authorized, else it is unauthorized and based on the space available, particular lot is provided to the user to park their vehicle. Parking charges are free for authorized vehicles and the non-authorized ones are charged depending upon the time the vehicle is parked.

4. OVERALL SYSTEM ARCHITECTURE

Initially, user have to authorize themselves by registering into the system then user have to login and session for the particular user will be created.

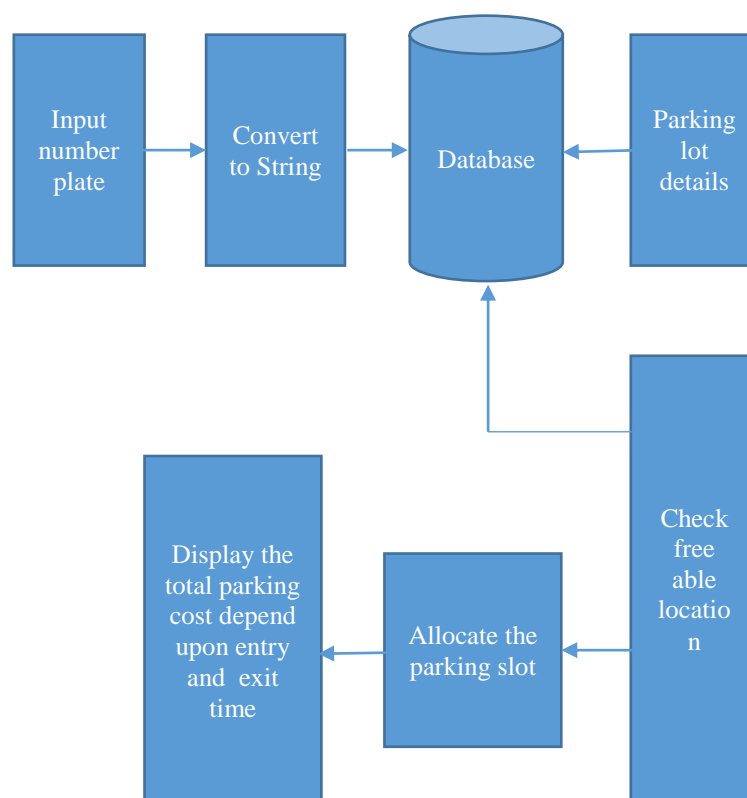


Fig 1: System Design

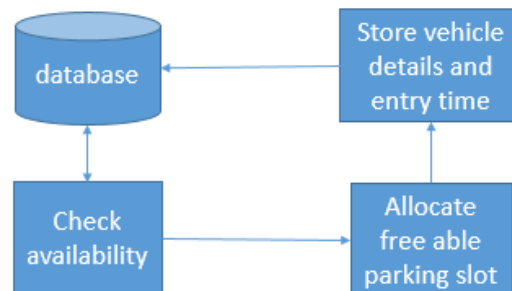
4.1 DATABASE

All parking lot details stored into database.



4.2 ALLOCATE PARKING LOT

Checking the availability of parking slot, after any parking slot is free then allocate the particular vehicle. Store the vehicle details and entry time to the database. Number plate recognition Recognition of number plate is the effectiveness of this system. Firstly, the image of number plate is captured and save that image in storage. We are using optical character recognition that process and identifies individual alpha numeric characters on number plate. Click picture, save that picture in storage with the file called "Tess data" with language which we are recognizing here i.e., English. Rotate image as per the Tesseract Library if image clicked by user is wrong. Then convert that image to ARGB_8888 format required by Tesseract Library Send that image to Tesseract API to recognize text on that image. In that API convert image to gray scale, resize image, remove extra space around. Increase contrast to better implementation.



4.3 PARKING COST

The vehicle exits from parking lot, particular vehicle details checking to the database after display the total amount of parking cost depend upon entry and exit time. Indeed, parking enforcement is performed according to what the posted parking rules are for a give alleged violation no database can be checked; rather, the test is what was posted at the time and place of the alleged violation. Therefore, directly capturing the rules and tagging their locations is the only way to address this problem.



5. CONCLUSION

The development of reservation for parking slots commanded by android application, number plate recognition, parking slot status and electronic billing system is implemented. The proposed system reduces the drivers' effort and time to search parking space. Also the payment transaction is handled online which makes the system less human dependent.

6. FUTURE ENHANCEMENT

The study analyses the key operational strategies of parking operators, parking app providers, automakers and their implications on mobility integration. An attempt has been made to understand the major parking operators' and parking app providers' operational business models. The study also entails the major parking technologies used in the

area of ticketing, vehicle number plate recognition, and parking space availability. It draws a comparison of the conventional and modern parking industry, which is now considered as a significant entity of mobility in cities.

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