Unauthorized Parking Challan System

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ABSTRACT: With the increase in population, there is increase in number of vehicles number and due to which parking of a vehicle is also increasing whichresults in more traffic. Now a days people wherefind the place for parking, park their vehicle at restricted or unauthorized place. Vehicles at no parking cause the narrow of road and which result in traffic roadblock. For this number of traffic police has been deployed to keep a check on unauthorized parking and make the challan ofthe owner who parked his vehicle at np parking area, so they would not park their vehicle inunauthorized, but it is not that effective solution as there is large number of people who parked vehicles at no parking zone. Therefore, New technologies has been used for the detecting vehicles which are illegally parked at unauthorized zone. In this paper, we have discussed detailed a survey on various detection methods and control measures.

I.   INTRODUCTION

In recent years, transport complexity has been increased with the increase of population which led to the increase in number of vehicles which results in increase in amount of work of traffic control which requires lot of man force foe controlling such traffic congestions. In view of the increase in traffic control, we are designing an automated Unauthorized Parking Challan System which automatically detects the vehicle parked then extract the number plate and search in database then send a challan to the vehicle owner on his registered email id who had parked their vehicle at wrong unauthorized or no parking zones.

II. BACKGROUND STUDY

The prospect of unauthorized parking in no parking zone is a serious issue as it can result in traffic congestion and with the increase of population number of vehicles are also increasing. To meet the demand of increase in traffic control lot of manpower is required therefore instead of manpower we are making a system which can detect the vehicle which parked at no parking zone. Our system will detect the vehicle and send a notification to the owner of the car using machine learning algorithms and raspberry pi which can be easily installed at the no parking zone and give high performance and fast output for the system.

II.   OBJECTIVE AND SCOPE

The objective of system is to provide a simple way for detection of vehicle number plates through the camera later on, the license number from the image is extracted using Machine Learning Algorithms and sent to the database for the search of its associated email id in the database and send penalties in the form of Challan to the associated phone numbers through third-party software. Hopefully this solution is used to defend the parking violation concern. The project concerns with application of an Unauthorized car park, License Plate Recognition and processing the obtained number plate digits to notify the vehicle owner through email for a challan. The design consideration can be applied at any vehicle entry point. The system is power dependent and so with the current power shortage, a standby power source should be used.

III.   METHODOLOGY

First the image will be captured by the camera of the vehicle which will parked at no parking zone. After capturing image, the number plate will be detected by the modern algorithms ofmachine learning using OpenCV for the detection and extraction of number plate. Numbers from the number plate will be extracted by the python library tesseract which extract the number on the basis od contours and gradient of the number plate after extraction from the number of a number plate, we check the number plate in the database which is createdby the python library SQL. In database we have train database by using different car number plate to detect the number from the number plate and save in database with the user personal information. After searching through the database if the match found for the vehicle number plate than the column of an email will be called by the program and after getting the email id a notification in the form of challan has been send to the owner of the car for parking in unauthorized zone.
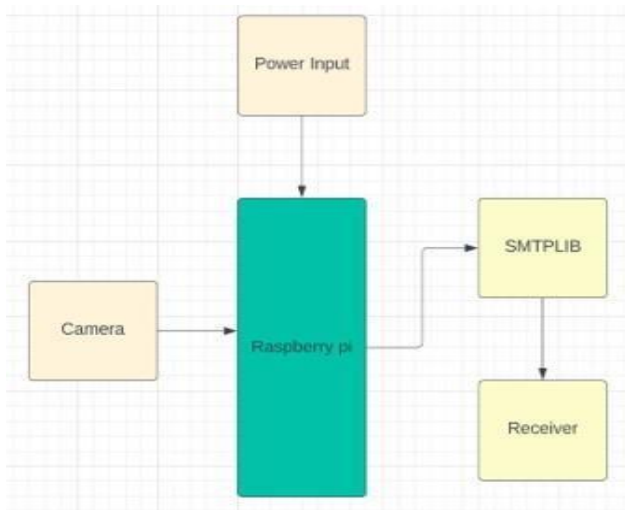
IV.   BLOCK DIAGRAM:

Figure 2.0

V.   SYSTEM DESCRIPTION

Detection of Image

In our system continuous power supply is provided through 2 Ampere adapter which isconnected to raspberry pi. In port 1 of raspberry pi camera is connected. MicroSD card is inserted into the raspberry pi which contains all the codes and libraries which are required for working of our system. When we run codes using thony camera get started it detects the vehicle through image processing and take the reference image of name reference1.jpg then resize it using imutils library and then convert image into grey image. Using blur to reduce the noise present in the image. We are displaying reference image after setting its height and width (620x480) After converting into grey image, we perform edge detection and find contours then according to the size of contours we crop the number plate from the image.

3.3 Segmentation:

After getting the image we are taking a variable name Gray then we are passing our input image to cv2.cvtcolor. Cv2.color_BGR2Gray specifies that the image has been converted to grey. After converting it to Gray, we are reducing the noise present in the image using cv2.bilateralFilter which reduces the noise and smoothing it. Then we created a variable named edge, we are passing our smoothen image to cv2.canny as edge=cv2.canny(Gray, 30, 200), which will perform the edge detection. We are taking variable cnts for contours, RETR_LIST will retrieve all the contours, CHAIN_APPROX_SIMPLE will remove all the redundant points on the contours detected then we make a copy of our original image edge.copy(). Then we grab our contours using imutils.grab_contours. We are sorting contours based on minimum area 10. Screencnt stores the contours of number plate.Cv2.drawcontours draw the contours on the detected image.

Then we creating a loop over over the contours to find the best contours. For perimeter of contours, we are taking variable peri = cv2.arcLength(c, True). Approxpolydp approximate the curve of polygon with accuracy approx = cv2.approxPolyDP.

We are taking the condition if len(approx) == 4 which choose the contours of four sides which is probably our number plate. After getting the contours, we are masking the part using np.zero (gray.shape,np.uint8) and saving it in variable mask. Then we take a new variable new_image = cv2.drawContours(mask,[screenCnt],0,255,- 1,). It will display the part which is detected by our contours and all other part will be masked.

Figure 3.1

3.2 Text Extraction

When we get the cropped image of number plate then we extract the text and numbers using Pytesseract which is an OCR tool for python which read and recognize text in image shown in figure 3.1. We have taken text as a variable tostore the text detected from the image cropped as text = pytesseract.image_to_string, then we print the detected number in our panel. Then we filter our text using lambda and filter as we already stored all the required text in variable k, then we detect the any other special character is present or not if present then we will remove thespacing and special character present in it and join the text using join(getvals) stored invariableresult.

Figure 3.2

3.3 Search in database:

We have created a database vehicle_info, we write a query for checking the extracted number in database as cursor = conn.execute('SELECT mail FROM vehicle_info WHERE vehicle_no=?;', [result]), then we fetched the mail id and number plate from the database. After getting the number from image it checked from database which is created by using SQLlite then it check for the particular number in database and if it found the matched number it will send the notice to the owner of vehicle using its Gmail id which is saved in database.

VI. HARDWARE REQUIREMENT

4.0 Raspberry Pi 3:

In this unauthorized car parking system, we have used raspberry pi 3 8 gigabyte model for the working of our system. We have taken raspberry pi 3 as it supports the large and complex libraries of python more properly than the raspberry pi model 1 or 2 with low in ram. By using 8 gigabytes the processing speed of the system get faster and it takes much less time for the processing of the data as compared to low ram raspberry pi models. Raspberry pi can be installed easily by occupying very less installation space. Being a minicomputer it best suits for the processing of data and different types of libraries of different programming languages.

Specification Table of Raspberry pi 3

Raspberry Pi 3 Model B	
SoC	Broadcom BCM2837
CPU	4× ARM Cortex-A53, 1.2GHz
GPU	Broadcom VideoCore IV
RAM	1GB LPDDR2 (900 MHz)
STORAGE	microSD
Ethernet	10/100 Ethernet
Wireless	2.4GHz 802.11n wireless
Video Output	HDMI
GPIO	40-pin header, populated
Ports	HDMI, 3.5mm analogue audio-video jack, 4× USB 2.0, Ethernet, Camera Serial Interface (CSI), Display Serial Interface
Price	30$

4.1 Camera:

We have used 8-megapixel camera for capturing images of the vehicles as it is of low cost and can be easily installed at the no parking zone. As camera helps in capturing the good images of vehicles. It is connected to the raspberry pi which already have predefined algorithms for the detection of the vehicle

4.2 MicroSD Card 16 gigabyte:

The microSD Card is the smallest component which is used to store data now a days. It's a variation of the standard SD CARD and uses a similar set of electrical connections. It can be fit in the slot given in electronic devices. In this we store our data of codes which is then installed on raspberry pi, it contains all the data and programs which are used to run our system.

VII. SOFTWARE REQUIREMENT:

5.0 Thonny:

It is an integrated development environment used for running and debug python program. It has simple interface which is easy to use and supported by raspberry pi as it is light weight and easy to understand.

5.1 VNC Viewer:

VNC is virtual network computing which is used to control the other device using different device wirelessly. In our system we used VNC viewer to see the programs and run codes from distance from the raspberry pi. As our system must be installed in no parking zone so it should have something to control it remotely.

FUTURE SCOPE:

• The project is limited to detect the unauthorized Parking and send a challan to the owner of the car.

• We will try to detect the car at night also and by detecting the headlights.

• In future try to increase the range of the car detection and apply modern techniques to reduce cost and more efficient.

• To reduce the cost of the already available systems by using new technologies and modern Algorithms.

ADVANTAGES:

• This system provides the automatic detection of unauthorized parked vehicle which reduce the roadblocks.

• It helps in reducing the manpower as it can be installed in unauthorized parking places and can detect automatically illegal parking and send challan to the owner of vehicle.

• It is fast and time saving system as it works on modern technologies.

SYSTEM WORKFLOW:

VIII. CONCLUSION
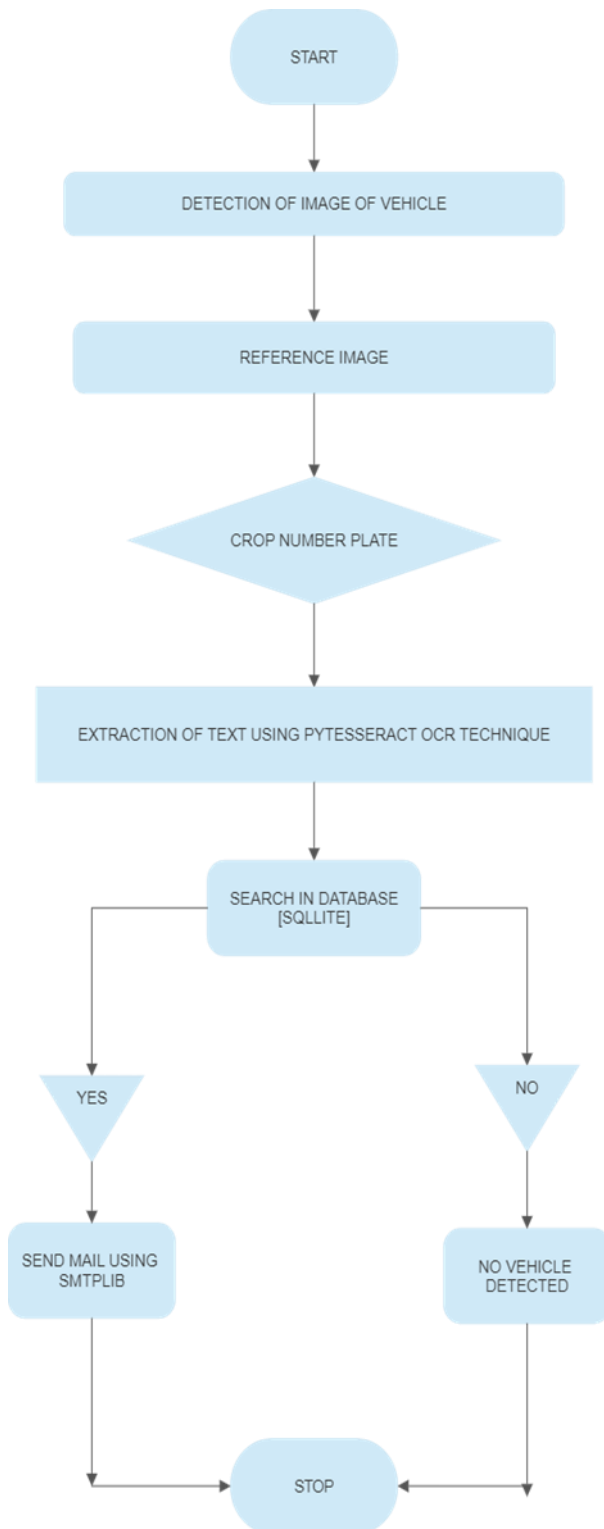
This system provides a stable and fast system for detection of unauthorized parking. Raspberrypi can be easily installed, and codes can be easily modifying by using new algorithms as it provides more precise output and reduce the manpower which saves the time by automatic detection of vehicle. If we want to modify in code or if want to use different version of raspberry pi for better performance, it can be easily done by replacing raspberry pi with new model can make the system faster as the processing will take much less time as compared to the older versions. As the code is in python language it can be modified by the modern algorithms which can also enhanced the performance of the system and add new featuresto the system.

IX. REFERENCES

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