[UPI]

UNAUTHORISED PARKING IDENTIFIER

A Course Project report Submitted in partial fulfillment of the Academic requirements for the award of the degree of

Bachelor of Technology

Submitted by

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UNDER THE COURSE

SOCIAL INNOVATION IN PRACTICE

CENTRE FOR ENGINEERING EDUCATION RESEARCH
CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
(NAAC Accredited with 'A+' Grade & NBA Accredited)
(Approved by AICTE, Permanently Affiliated to JNTU Hyderabad)
KANDLAKOYA, MEDCHAL ROAD, HYDERABAD-501401 2022-23

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CERTIFICATE

This is to certify that the course project report entitled **"UNAUTHORISED PARKING IDENTIFIER"** is a Bonafide work done by **ALAVALA KAVYA(21H51A0528) , DAVULURI SAI SUJAN (21H51A0534),KOLAN SAHASRA (21H51A0539,LOKOTISRI CHARAN(21H51A0541), MANGA YOSHITH GOUD (21H51A0543), THAKUR ABHINAV SINGH(21H51A0548) of** I B. Tech, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology, submitted to Centre for Engineering Education Research, CMR College of Engineering & Technology, Hyderabad during the Academic Year 2022-23

Names of the project coordinators   **B. Suresh Ram**
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 3.Mr. b. Kondalu (Asst. Prof)

DECLARATION

We, the students of I B. Tech II Sem of Centre for Engineering Education Research , CMR COLLEGE OF ENGINEERING AND TECHNOLOGY, KandlaKoya , Hyderabad, hereby declare, that under the supervision of our guide course coordinators, we have independently carried out the project titled "**Unauthorised parking identifier**" and submitted the report in partial fulfillment of the requirement for the award of Bachelor of Technology in by the Jawaharlal Nehru Technological University, Hyderabad (JNTUH) during the academic year 2022-23.

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ACKNOWLEDGEMENT

ABSTRACT

The Traffic in the metropolitan urban areas plays an essential part in road problems. Though many changes are happening in the E-Challan systems and traffic maintenance methods, some new methods are indispensable to control the traffic in urban areas. Mainly no-parking areas are the main concern and it always leads to the traffic problem. Basically, there are many reasons for the traffic congestion out of them one major problem is due to parking of a vehicle in crucial areas. It also increases air pollution, travel time, fuel cost, energy consumption, which in some ways affects the quality of the services of the organizations and mankind.

A regular monitoring system is needed to monitor the no parking zones which help to solve the problem occurred by parking the vehicles in no parking areas. This project proposes an "**Unauthorised Parking Identifier**" with the help of number plate detection using OpenCV library. Cameras are used to get the images of vehicles parked in the restricted areas. License numbers which are detected through traffic cameras automatically search for the registered phone numbers in the database and send this SMS to the registered phone number that if the vehicle is not removed in 5 minutes you need to pay e-challan as violated the regulation proposed by the respective government if not removed then needed to pay the fine.

Maintaining no parking areas is an essential part of controlling traffic in urban areas since these vehicles consuming a roadside place and creates a congested way to moving vehicles. To resolve this issue, a complete monitoring system is needed to be installed in non-parking zones.

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1. INTRODUCTION

In India particularly with such an oversized population of over 4 billion, as everyone from rural to urban was aspiring for superior opportunities and benefits made India have heavy traffic congestion on its roads. The valuable time of every working professional is being wasted on the roads. It also increases air pollution, travel time, fuel cost, energy consumption, which in some ways affects the quality of the services of the organizations and mankind. Basically, there are many reasons for the traffic congestion out of them one major problem is due to parking of a vehicle in crucial areas. Previously Indian Government had introduced many methods for traffic management so, we are using one of their innovations in a strategic way to reduce traffic congestion in some way through i.e., through E-Challan System. With this system one can monitor and regulate the vehicles parked around the designated area, by this there will be no disturbances in that particular lane or colony.

2.LITERATURE REVIEW

In previously there are many existing models for number plate detection. Most of them are common with the grey conversion of image initially but differed with the character extraction from the number plate.K-NN (k-nearest neighbors) is a non-parametric algorithm, used for pattern recognition and classification. It uses 'feature similarity' to speculate the values of new obtained data points which further implies that the new data point is going to be assigned a worth supported how closely it matches.

The points within the training set of knowledge .In other methods of the license plate detection, the number plates have vertical edges to detect the potential license plate.2D-Wd is used to extract the vertical edges. The high-density areas of the vertical edges are extracted by calculating the maximum entropy areas to detect the potential license plate candidates. CNN classifier to remove the false positive. In the character recognition stage, the characters are segmented first by detecting the empty lines between the characters, then these segmented candidates are classified by training 42-class CNN classifier to acknowledge thecar place characters.

In one more way is python tesseract, it is an optical character recognition tool which helps in extraction of the characters from the license plate of a vehicle and send to the database for the further use . The other method is the detection of Edges of the number plate using Robert's operator to make sure the difference between the license plate front and back part of license plate. Image erosion operation and morphological closed operation are performed, eliminating the smaller parts which are not a part of the registration plate region .

CHAPTER 3

3.1 PROBLEM STATEMENT

The traffic monitoring system of maintaining the no-parking areas healthy followed by the respective authorities needed to be automated since one cannot monitor the no-parking zones all the time. So, they should aim at an automated monitoring system which helps them to keep no-parking zones free from parking.

3.2 NEED STATEMENT

We usually see vehicles get parked in the no parking areas which increases traffic drastically and police are manually capturing vehicles number plate for fine or echallan as this is not possible everytime. So we thought of automatical fining "**UNAUTHORISED PARKING FINE DEVICE**".

3.3 REQUIREMENT ANALYSIS

HARDWARE DESCRIPTION:

1. Raspberry pi
2. Pi Cam
3. Micro USB Cable with Adapter
4. IR Sensor

SOFTWARE DESCRIPTION:

1. VNC Viewer
2. Putty Software

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3. Python IDE

RASPBERRY PI:

Raspberry Pi 3 B+ was introduced by Raspberry Pi foundation on 14th March 2018. It is an advanced version of Raspberry Pi 3 B model that was introduced in 2016.It is a tiny computer board that comes with CPU, GPU, USB ports, I/O pins, WiFi, Bluetooth, USB and network boot and is capable of doing some functions like a regular computer.

Features of the B+ version are almost same as B model; however, USB and Network Boot and Power over Ethernet facility only come with B+ model. Also, two extra USB ports are added to this device.The SoC (system on chip) combines both CPU and GPU on a single package and turns out to be faster than Pi 2 and Pi 3 models.
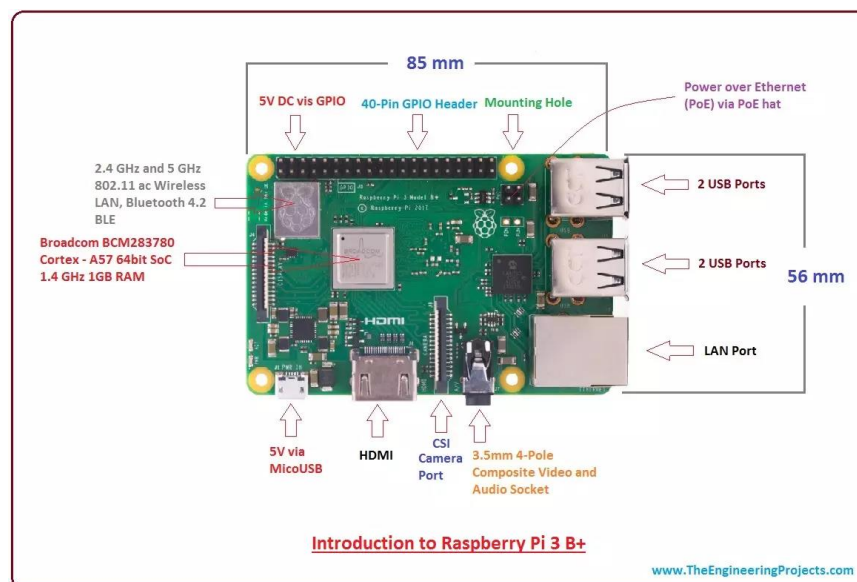
PI CAMERA:

The **Pi camera module** is a portable light weight camera that supports Raspberry Pi. It communicates with Pi using the MIPI camera serial interface protocol. It is normally used in image processing, machine learning or in surveillance projects. It is commonly used in surveillance drones since the payload of camera is very less. Apart from these modules Pi can also use normal USB webcams that are used along with computer.

PI CAM FEATURES:

- 5MP colour camera module without microphone for Raspberry Pi
- Supports both Raspberry Pi Model A and Model B
- MIPI Camera serial interface
- Omni vision 5647 Camera Module
- Resolution: 2592 * 1944
- Supports: 1080p, 720p and 480p
- Light weight and portable (3g only)
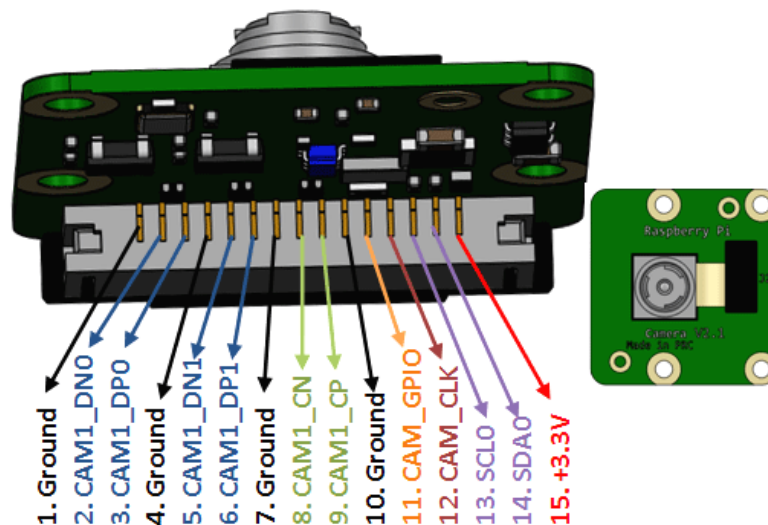
JUMPER WIRES:

A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Jumper wires are of three types: male-male, female-male, female-female.

IR SENSOR:

IR sensor is a simple electronic device which emits and detects IR radiation in order to find out certain objects/obstacles in its range. Some of its features are heat and motion sensing.IR sensors use infrared radiation of wavelength between 0.75 to 1000μm which falls between visible and microwave regions of electromagnetic spectrum. IR region is not visible to human eyes. Infrared spectrum is categorized into three regions based on its wavelength i.e. Near Infrared, Mid Infrared, Far Infrared.

Wavelength Regions of Infrared Spectrum:

- Near IR – 0.75µm to 3 µm

- Mid IR – 3 µm to 6 µm

- Far IR – > 6 µm

How Infrared Sensor Works:

An Infrared Sensor works in the following sequence:

- IR source (transmitter) is used to emit radiation of required wavelength.

- This radiation reaches the object and is reflected back.

- The reflected radiation is detected by the IR receiver.

- The IR Receiver detected radiation is then further processed based on its intensity. Generally, IR Receiver output is small and amplifiers are used to amplify the detected signal.

3.4 METHODOLOGY:

In this project python libraries along with few third-party software's are used to perform processing. Initially, it uses the cameras placed in the public of the license plate of the vehicles through the OpenCV module . The OpenCV is integrated with the Harscascade file which is patterned with features of the Indian number plate ,so this OpenCV module along with the Harcascade file finds the position of the number plate within the car and save the corresponding image of the number plate for the further processing.

The image is further operated by the Google Vision API for the Extraction of the characters from the Number plate. So, with this Vision API we perform text extraction from the images which are previously captured using the OpenCV. In addition to this we actually get fewer unwanted symbols if our number plate is not so clear in the resolution or if there is no proper light. The operation of this Vision API totally depends on the kind of image taken by the OpenCV (in terms of pixels). So, if an image is high in pixels, we can easily get the required text from the image else we might end up with few other symbols along with the required text.

The text (characters from number plate) extracted from here is sent to the database for further processing. Within this project we initially connect XAMPP to the code by enabling port numbers of Apache and MYSQL and we administrate through MYSQL for quarrying operation so this will enable the PHP MyAdmin local host for retrieving datasets and later on we deploy few datasets which are related to the License numbers and their associated phone numbers into XAMPP database through SQL queries just like an RTO database.

On the other hand, the google vision API OCR extract the characters from the number Plate image and send them directly to the XAMPP to perform search operation for the license number associated phone number, if it finds any phone number then the XAMPP commands the Twilio for the next action. So, the Twilio, a third-party software used for the purpose of sending E

-Challan to the phone numbers found in the XAMPP database, we actually get a unique identification and a token for each individual who created an account for the service. The XAMPP commands the Twilio for messaging the required format of penalty to the license plate associated phone numbers if it found in the database. Here we can use this messaging service, i.e., Twilio only for a limited period.

CHAPTER 4

4.1 DEFINITION

This Unauthorised parking identifier consists of raspberry pi with open cv modules and has a pi camera which captures the image of a vehicle when it enters the no parking area. We use google vision API, XAMPP commands.

By using all these components it would be helpful to monitor the no parking areas which plays a crucial role in road transportation problems.

4.2 NEED OF UNAUTHORISED PARKING IDENTIFIER

The need of this project is to provide a simple way to use every innovation of traffic management and their public investments like high resolution cameras. As it involves the detection of vehicle number's plate through the pi camera placed in no parking areas and penalties in the form of E challan to the associated phone number or Email through third party software. Hopefully This solution is used to defend the parking violation concern and reflects the reduction of vehicle count in no parking zones, as penalty made people restricted towards the rule.

4.3 JUSTIFICATION

This Unauthorised parking identifier can easily capture the vehicle's number plate and extract the characters very feasible. As it is small in size it is easy to place where ever required and sends messages in the form of Email so that the people get penalties and realize not to make the roads congested and helps in monitoring.

4.4 PURPOSE

Improving the traffic maintenance system is still needed an active and challenging research in many areas which causes traffic problems because road transportation plays a crucial role in human daily life. This provides a solution for the traffic problems occurred by road side parking vehicle at no parking zones. As maintaining no parking areas is an essential part of controlling traffic in urban areas since these vehicles consuming a roadside place and creates a congested way to moving vehicles. To resolve this issue, a complete monitoring system is needed to be installed in non-parking zones. Hopefully the proposed system gives a solution for monitoring the non-parking areas. The proposed E-challan system reflects the reduction of vehicle count in no parking zones, as penalty made people restricted towards the rule passed by the respective authority.

4.5 SCOPE

- The size of the proposed solution could be less as we use more software specifications than hardware
- It decreases the traffic by a significant amount
- It also decreases the work load of the traffic police as they don't need to capture each and every number plate manually

CHAPTER 5

5.1 EXISTING SOLUTONS

- ## DISPLAYING BOARDS

Many places there are displayed as non parking zone.

Advantages:

It is very less cost. It can be offerby anyone.While this problem is troublesome, advertisers have found a way to exploit it for benefit of their clients

Drawbacks:

- As people watch regularly, they may ignore it.
- It may fall due to wind storms**.**

- **WARNING SPEAKERS**

  These are normal speakers

  Advantages:

  The speakers announces as it is prohibited to park the vehicle.

  It costs low.

  Drawbacks:

  They may damage due to always warning and power consumption is also more.

  It causes disturbance to the surroundings**.**

- **CC CAMERA**

  When a vehicle is parked at prohibited area

  then cc cameras take footage.

  Advantages:

  It also secure the vehicles.

Disadvantages:

It require a human to observe the footage.

Cc cameras costs very high.

- **WRONG PARKING ALARMS**

  It is the device which works on sensors

  and Arduino.

  Advantages:

  When the vehicle approaches it warn the driver.

  Drawbacks:

  It costs high in price with basic features.
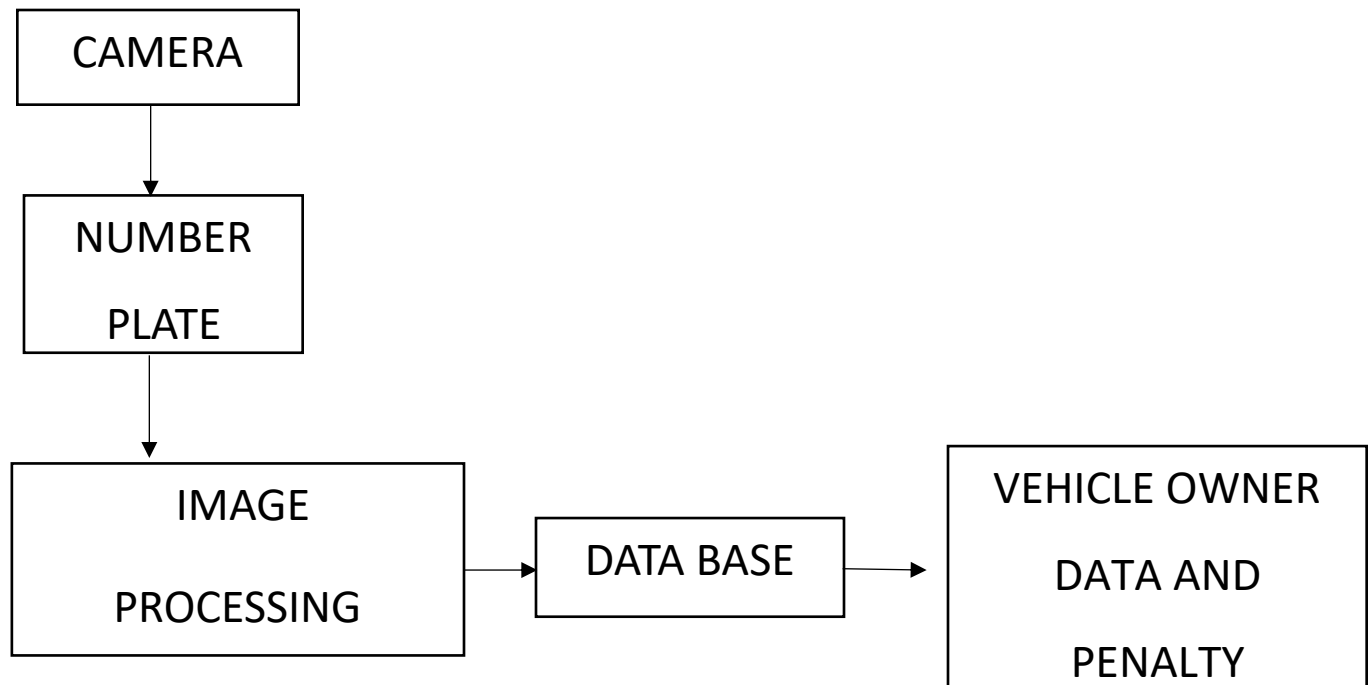
CHAPTER 6

IMPLEMENTATION

6.1 WORKING

The aim of this paper is to provide a simple way to use every innovation of traffic management and their public investments like high-resolution cameras. Initially, it uses the cameras placed in the public and crucial areas for Acquisition of the license plate of the vehicles through the OpenCV module. The OpenCV is integrated with the Har cascade file which is patterned with features of the Indian number plate. So this OpenCV module along with the Har cascade file finds the position of the number plate within the car and save the corresponding image of the number plate for the further processing.

The image is further operated by the Google Vision API for the Extraction of the characters from the Number plate. So, with this Vision API we perform text extraction from the images which are previously captured using the OpenCV. In addition to this we actually get fewer unwanted symbols if our number plate is not so clear in the resolution or if there is no proper light. The operation of this Vision API totally depends on the kind of image taken by the OpenCV. So, if an image is high in pixels, we can easily get the required text from the image else we might end up with few other symbols along with the required text. The text extracted from here is sent to the database for further processing. Within this project we initially connect XAMPP to the code by enabling port numbers of MYSQL and we administrate through MYSQL for quarrying operation so this will enable the PHP MyAdmin local host for retrieving datasets and later on we deploy few datasets which are related to the License numbers and their associated phone numbers into XAMPP database through SQL queries just like an RTO database.
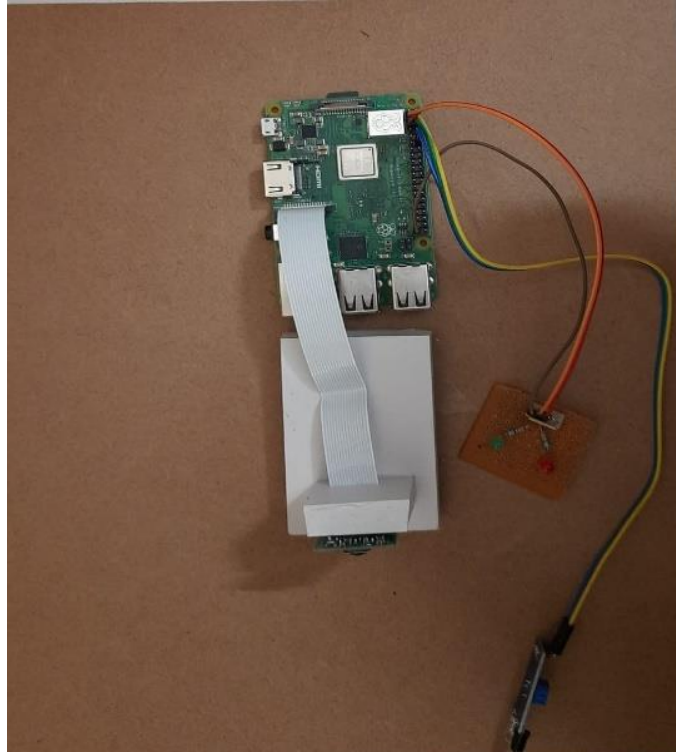
On the other hand, the google vision API OCR extract the characters from the number Plate image and send them directly to the XAMPP to perform search operation for the license number associated phone number, if it finds any phone number then the XAMPP commands the Twilio for the next action. So, the Twilio, a third-party software used for the purpose of sending E -Challan to the phone numbers found in the XAMPP database, we actually get a unique identification and a token for each individual who created an account for the service. The XAMPP commands the Twilio for messaging the required format of penalty to the license plate associated phone numbers if it found in the database. Here we can use this messaging service, i.e., Twilio only for a limited period.

The data within the database is deployed through SQL queries and the extracted text from the google vision API OCR is checked with the datasets of database, if the text matches with any of the primary keys of the data set then its associated phone number is retrieved. The retrieved phone numbers are further sent to the third-party software's like Twilio. These software sends the penalty in the SMS format to the violators phone.

6.2 BLOCK DIAGRAM

```
┌──────────────┐
│   CAMERA     │
└──────┬───────┘
       │
       ▼
┌──────────────┐
│   NUMBER     │
│              │
│    PLATE     │
└──────┬───────┘
       │
       ▼
┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│    IMAGE     │      │              │      │  VEHICLE OWNER   │
│              ├─────▶│  DATA BASE   ├─────▶│   DATA AND       │
│  PROCESSING  │      │              │      │    PENALTY       │
└──────────────┘      └──────────────┘      └──────────────────┘
```

6.3 PROTOTYPE

CHAPTER 7

7.1 RESULTS AND DISCUSSIONS:

With this proposed system we utilize the Cameras placed in crucial areas which are monitoring the no parking areas 24/7. The detection of license plate within a vehicle is performed. The image of this detected license plate is operated by the Google Vision API in the background for the extraction of the characters from the number plate console and send those characters to the database for the search operation. If there is any license number registered phone number, then the database commands third party software's for the further action. As the number plate associated phone number is found within the database then the towel comes into action for sending the SMS format of E-challan to the respective phone number.

7.2 CONCLUSION:

Improving the traffic maintenance system is still needed an active and challenging research in many areas which causes traffic problems. Because road transportation plays a crucial role in human daily life. This research provided a solution for the traffic problems occurred by roadside parking vehicle at no parking zones. Maintaining no parking areas is an essential part of controlling traffic in urban areas since these vehicles consuming a roadside place and creates a congested way to moving vehicles. To resolve this issue, a complete monitoring system is needed to be installed in non-parking zones. Hopefully the proposed system gives a solution for monitoring the non-parking areas. The proposed "**Unauthorised Parking Identifier"** reflects the reduction of vehicle count in no parking zones, as penalty made people restricted towards the rule passed by the respective authority

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7.3 CODE

```
import RPi.GPIO as GPIO
import time
import picamera
import cv2
import datetime
import os
import serial
from pytesser import *
import smtplib

camera = picamera.PiCamera()
camera.resolution = (1024, 720)

gmail_user = "raspberry1786@yahoo.in" #Sender email address
gmail_pwd = "wtrbggvdvpu" #Sender email password


time.sleep(0.3)
to = open('/home/pi/email.txt').read()
print (to)

time.sleep(0.1)
to1 = open('/home/pi/email1.txt').read()
print (to1)

time.sleep(0.1)
to2 = open('/home/pi/email2.txt').read()
print (to2)

time.sleep(0.1)
to3 = open('/home/pi/email3.txt').read()
print (to3)

time.sleep(0.1)
to4 = open('/home/pi/email4.txt').read()
print (to4)


IMAGE_FILE = 'img.jpg'

# Define GPIO to LCD mapping
LCD_RS = 11
```

```
LCD_E  = 9
LCD_D4 = 10

LCD_D5 = 22
LCD_D6 = 27
LCD_D7 = 17

LEDR = 3
LEDG = 2

IR1 = 18



def main():

  GPIO.setmode(GPIO.BCM)        # Use BCM GPIO numbers

  GPIO.setup(IR1, GPIO.IN) # IR


  GPIO.setup(LEDR, GPIO.OUT) # LED
  GPIO.setup(LEDG, GPIO.OUT) # LED

  GPIO.output(LEDR, True) # LED
  GPIO.output(LEDG, True) # LED
  time.sleep(0.7) # 700 milli second delay
  GPIO.output(LEDR, False) # LED
  GPIO.output(LEDG, False) # LED
  time.sleep(0.7) # 700 milli second delay
  GPIO.output(LEDR, True) # LED
  GPIO.output(LEDG, True) # LED
  time.sleep(0.7) # 700 milli second delay
  GPIO.output(LEDR, False) # LED
  GPIO.output(LEDG, False) # LED

  time.sleep(1) # 3 second delay
  i = 0
  tcount = 0
  valid = 0
  id = 0

  VN = ''
  count =0
  speed = 0
```

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```
   while True:

        lcd_byte(0x01, LCD_CMD)
        lcd_string("Monitoring",LCD_LINE_1)

        GPIO.output(LEDR, True) # LED
        time.sleep(0.3) # 700 milli second delay
        GPIO.output(LEDR, False) # LED

        if not GPIO.input(IR1):
            print('Hello')
            i = 1


        if i == 1:
             i = 0


            print('Vehicle Detected')
            time.sleep(0.1) # 1 second delay


            camera.capture('hvs.jpg')

            time.sleep(0.3) # 1 second delay

            img=cv2.imread('hvs.jpg')
            time.sleep(0.2)
            output = subprocess.check_output("tesseract hvs.jpg stdout",
shell=True)

            open("data.txt","w").close()
            text_file = open("data.txt","w")
            time.sleep(0.3)
            text_file.write(output)
            text_file.flush()
            time.sleep(0.1)

            lines = open("data.txt",'r').readlines()
            data = open("/home/pi/numbers.txt",'r').readlines()

            for j in range(len(lines)):

                for i in range(len(data)):

                    if lines[j] == data[i] > -1:
```

```
                print '--------------------'
                VN = data[i]
                id = i
                valid = 1
                print '--------------------'

        tcount = tcount+1
        if valid == 1:

            GPIO.output(LEDG, True) # LED
        if tcount > 7:
            if valid == 1:
                valid = 0
                tcount = 0
                print VN
                print id

                GPIO.output(LEDR, True) # LED
                print("Sending mail")

                dt_stamp = datetime.now().strftime("%d-%m-%y
%H:%M:%S")

                subject = "No Parking Challan :"+dt_stamp

                text = "No Parking Challan : - Photo Attached"


                attach = 'hvs.jpg'
                msg = MIMEMultipart()

                msg['From'] = gmail_user
                msg['To'] = to
                msg['Subject'] = subject

                msg.attach(MIMEText(text))

                mailServer.login(gmail_user, gmail_pwd)
                mailServer.sendmail(gmail_user, to, msg.as_string())

                mailServer.close()
                print "Email Sent"

                time.sleep(6)
```

```
attach = 'hvs.jpg'
msg = MIMEMultipart()

msg['From'] = gmail_user

if id == 0:
    msg['To'] = to1

if id == 1:
    msg['To'] = to2

if id == 2:
    msg['To'] = to3

if id == 3:
    msg['To'] = to4

msg['Subject'] = subject

msg.attach(MIMEText(text))

mailServer.login(gmail_user, gmail_pwd)

if id == 0:
    mailServer.sendmail(gmail_user, to1,
msg.as_string())

if id == 1:

    mailServer.sendmail(gmail_user, to2,
msg.as_string())

if id == 2:

    mailServer.sendmail(gmail_user, to3,
msg.as_string())

if id == 3:

    mailServer.sendmail(gmail_user, to4,
msg.as_string())

mailServer.close()
print "Email Sent"
time.sleep(3)
```

```
                    GPIO.output(LEDG, False) # LED

        else:
                tcount = 0
                valid = 0
```

7.4 ADVANTAGES

1) It reduces traffic

2) The accidents may decrease

3) It saves the time and effort of police

4) Traffic violates help in curbing corruption

5) Less number of components

6) Simple to design

7.5 LIMITATIONS

The disadvantages are that most are not very efficient. We should fix IR sensor near to that zone because it can't detect the objects which are far away or we should use multiple IR sensors. If we have RTO database we can send penalties to the respective vehicle owner directly .Since the RTO database is confidential we send an email to E-challan.

CHAPTER 8

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