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A Novel Approach for Detecting Vehicles Parked in No Parking Zone Using Image Processing

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Abstract: ***The traffic problem in cities is increasing rapidly. It is associated due to several reasons. The Three Biggest tors causing traffic problems are Distort-ed Urbanization, population growth, and increasing private vehicles. The issue of car parking in urban regions has emerged as a significant concern in both developed and developing nations. The escalating parking costs, heavy traffic flow, and insufficient parking spots are some of the common parking-related problems that people encounter on a daily basis. The only solution to this problem is to search for parking spaces for prolonged periods of time. So, detecting vehicles in no parking area is the solution for this issue. This project works on detecting the number plate using OpenCV. By using image processing, the license number plate is captured and analyzed, and give warning to the driver is to move his/her vehicle to no parking region if they don't the amount will deduct from his/her account by traffic police. This system is specifically assembled for traffic police.***

Keywords: Image processing, OpenCV, Pi-tesseract, Python.

I. INTRODUCTION

Today in this developing generation parking is not yet considered the main issue This project title is detecting vehicles parked in parking prohibited areas, as this growing population of the world with the increasing number of private vehicles leads to various problems such as pollution, fuel cost, energy consumption but which mainly disturbs the management of that increasing vehicles leading to time consumption of citizens, draining of energy and also affects other factors related to that, resulting much off minor accidents and collisions. The population of urban areas and the land cover compared we don't have that properly managing space for parking, so improving upon the technologies and introducing such a system which helps us to benefit from the loss that is faced. Image processing supports the vehicle number plate detection and captures it, generating the automatic alert. The driver/owner should be responsible for it. India is facing a major challenge due to the increasing number of vehicles parked in no-parking areas. This has resulted in a significant increase in traffic congestion, air, and noise pollution, and other related issues. This has caused a lot of inconvenience to commuters and environmental hurt. The government had taken proactive steps to address this issue and ensure that citizens for having adequate parking facilities so that vehicles are not parked in no-parking areas.

Our system is mainly made for traffic policies. Our motive is that people should be aware of the innovations in traffic management through our project. As it includes the detection of license number plates of vehicles parked in the non-parking region and capturing their image using image processing technology. Later, OCR (Optical Character Recognition) is used to identify the characters in the image, convert it into a machine-readable format, and send an alert after a fixed duration with fine deduction messages (SMS) to the owner of the vehicle as per the system. Henceforth, we can avoid the chaos of vehicles and parking violation concerns.

II. LITERATURE SURVEY

The literature related to detecting vehicles parked in parking prohibited areas is analyzed in this section using image processing. Most illegal parking detection system applications track illegally parked vehicles using surveillance cameras and image processing algorithms. The IoT-based module to monitor the availability of parking slots is discussed in the research paper. The availability of a number of parking spaces for a particular area is made visible to users with the help of web-based software. This uses minimal sensor, CCTV, IOT network, naïve Bayes classification, image segmentation – MATLAB, view monitor (AVM). A similar approach is followed by [2]Research for real-time monitoring of unused parking spaces is an IOT-based parking system using mobile and web applications. We used IOT mobile applications and her web application to provide parking management, parking space availability monitoring, and parking management service. IoT, mobile apps, web applications, GPS-GSM modules, and image processing are also used. This system operates in the following manner: first user registration is done with the number then it is verified by the system.

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After login user has to select a parking slot, the vehicle type is then verified by Yolo then the user has to choose the desired parking slot, and then payment is to be done to the owner depending upon the number of hours then finalize the booking.

The research paper[3] E -challan System for the non-parking System the concept of using an open CV. The vehicle numbers are recognized by the traffic camera, which automatically looks up the phone number in its database and thereafter the E-challan in form of an SMS is sent to the registered number. It uses cameras, and Open CV for image processing. The research paper on [4]Automated parking systems and number plate recognition provided the idea of automatic number plate detection and recognizing parking space. After capturing the image of the number plate from the video feed, OCR (Optical Character Recognition) technology is utilized to identify the characters present on the plate. [7] This article presents a method that detects empty parking spaces in an indoor and outdoor environment which is a robust vision-based method. They've proposed an automatic image-stitching method followed by the issue of ambient lighting changes and difference in line color is taken into account and resolved and then reviewed the proposed algorithm(Zong & Chen, 2018). [9] When the car holder is at distance, it is hard to distinguish between an intruder and a car threat. And while parking congestion has always been a problem, there are only getting worse as urbanization and population growth continue. (Hussein et al., 2021). [14] This proposed platform is built on existing deep-learning approaches to provide algorithms that improve performance in recognizing license plate numbers from video. A way to estimate parking space is also provided. This is suitable for security patrol videos. Under law enforcement agencies there is responsibility for improperly parked vehicle detection which often requires manual inspection.

III. METHODOLOGY

Tools: PYTHON, OPEN CV

Technology: IMAGE PROCESSING

By applying a number of processes to digital images, image processing is a technique used to edit them. The image is often improved and changed, or relevant information is extracted from it. Common procedures include sharpening, cropping, noise reduction, color adjusting, and more. Additionally, image processing can be utilized for machine learning applications including object detection, facial recognition, object tracking, and others.

It is not always possible for the traffic authorities to keep an eye on each area. The majority public is also not aware of and strict about parking and non-parking areas. Therefore, our project aims to monitor the parking system automatically which helps to keep the non-parking area free. The first step would be to capture the image of the vehicle parking in the non-parking area with its number plate. This could be done using a good quality, waterproof, dustproof, durable, and wide-ranged CCTV camera which is suitable for any season. It is integrated with image processing codes. After capturing the image of the number plate it heads toward detecting it. This could be done using a computer vision algorithm that uses object detection techniques.

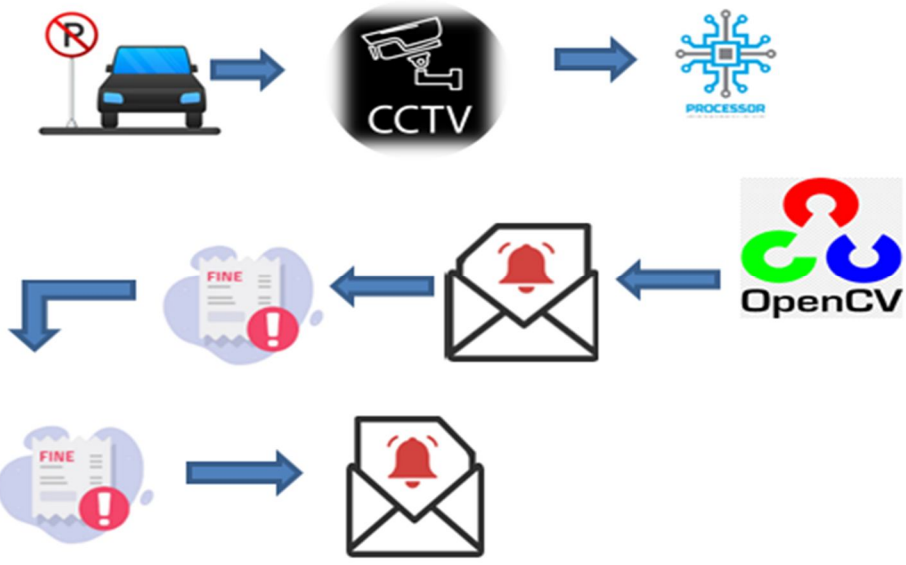


Fig 1: Workflow of The Proposed `System

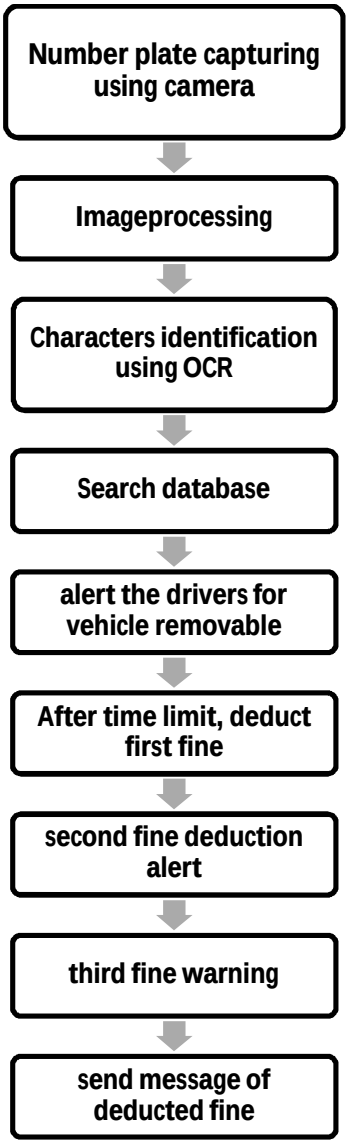


Fig 2. Flow diagram of The Developed System

Once the number plate is detected, it reads the characters in the number plate. This could be done using an Optical Character Recognition (OCR) algorithm which reads the characters in the number plate and stores them as text. The last step would be to match the number plate with the database of vehicles that are not allowed to park in the no-parking area. If a match is found, the system warns the owner to move his/her doesn't fine will be generated for the vehicle owner and it will automatically deduct the fine from the owner's account and send a message to the retrieved phone number of the driver. Then also he/she wouldn't move again the fine will be deducted.

IV. RESULTS AND DISCUSSIONS

As per the system, the vehicle number plate of a particular vehicle is detected using image processing technology. The further detected number is identified by the database along with the details of the owner so far for the next step it is done with the help of the cameras console fixed in that no parking zone, it keeps an eye 24/7 on the assigned area. When the vehicle is found the system performs the detection process, ones the search in the database is completed then it generates an alert message and sends it to the respective owner, this one is the first alert for the individual. After the duration in the system, the alert for the first fine is forwarded, if the individual fails to remove his/her vehicle, the second fine alert is generated. Again, if the vehicle is not removed the last i.e. the third fine warning is redirected, and when that division of times comes to an end the automatic fine deduction takes place.



Fig 3: Detecting the number plate using developed System

V. CONCLUSION

This upshot indicates the usage of innovative technologies in our system to reduce and prevail over the traffic problems and assure a smooth and efficient flow of traffic, ensure that roads and streets are safe for all users, ensure that roads containing motorized traffic do not impede traffic movement between areas, reduce local pollution, and ensure that noise is minimized. The mentioned proposition aims to tackle the issue of traffic congestion using innovative technologies. The use of these technologies is intended to facilitate the smooth and efficient flow of traffic. The system would also help in reducing local pollution and minimizing noise levels. By regulating the movement of motorized traffic in different areas, the system will enable safe and secure traffic control. In addition, the system would also regulate parking areas to maintain discipline.

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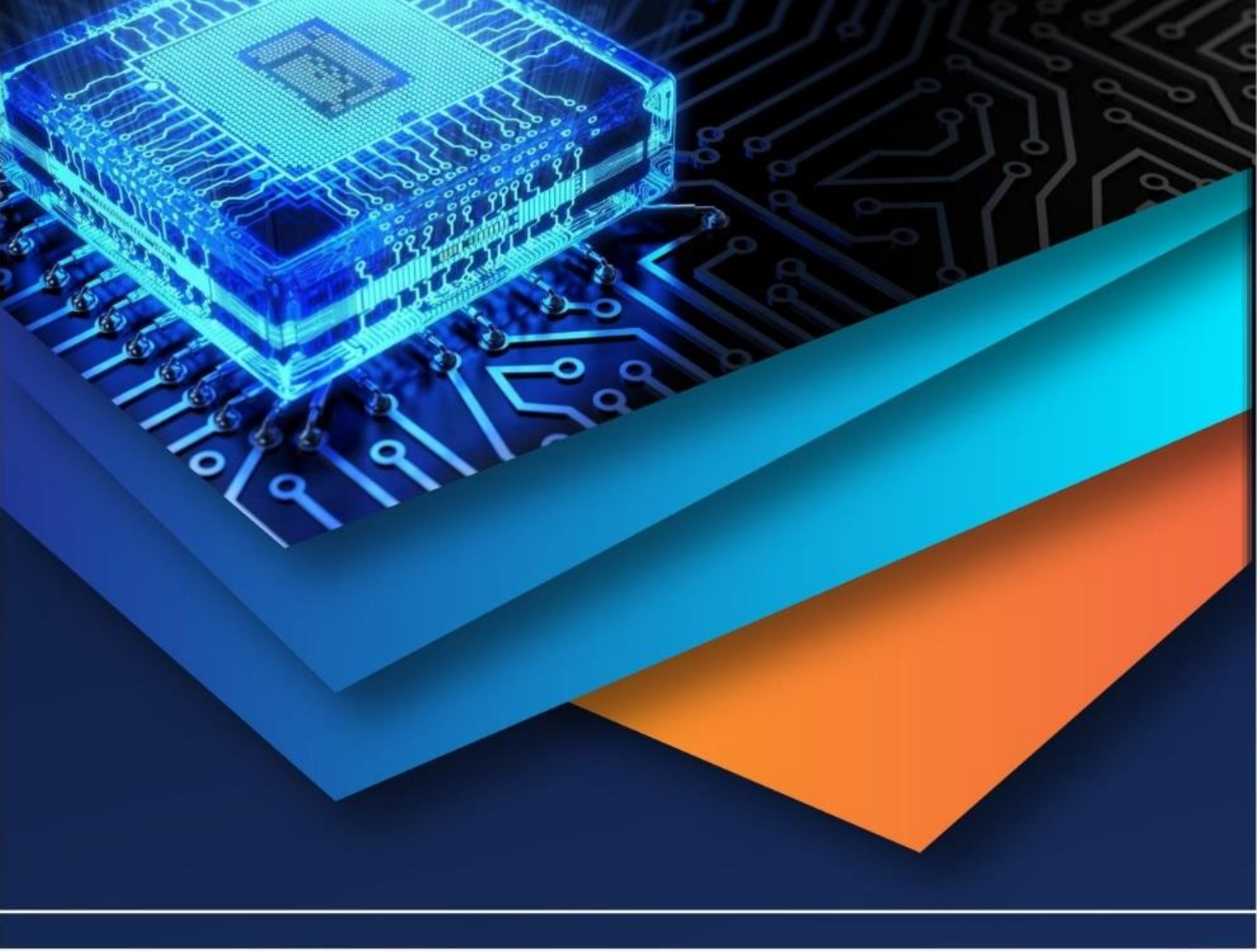
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