Enhanced Parking System by License Plate Recognition and Automated Place Allocation

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ENHANCED PARKING SYSTEM BY LICENSE PLATE RECOGNITION AND AUTOMATED PLACE ALLOCATION

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Abstract-

Due to the huge development of the society ,the shopping malls ,buildings and appartments are increased rapidly ,and also increase in the population in the society ,the usage of vehicles have been increased. In the IT sectors ,malls,buildings people are allowing to accommodate a greater number, it tends to create problem of vehicle parking in the parking slot. Automatic License Plate Recognition system is a real time embedded system which automatically recognises the license plate of automobiles. Numerous applications exist, ranging from intricate security systems to public spaces, parking admission, and urban traffic control. The complex characteristics of automatic licence plate recognition (ALPR) are caused by a variety of factors, including light and speed. The majority of ALPR systems are created with the aid of exclusive programmes like Matlab. The Open Computer Vision Library and Python are two examples of Free Software that are used to build an alternate approach to ALPR systems in this research. So We have come up with an idea ,we are trying to solve the problem, by tracking cars using their licence plates and allowing community members to provide verified information, access to vehicle entry and allows the parking slot to the user . In order to determine if a parking space is occupied or not, the number plate recognised using the Python and OpenCV library combines edge detection and coordinate bound pixel sections. Additionally, it shows how image to text conversion

has been implemented. OCR is used to extract text from the edited image. For the purpose of producing the best possible text output, the variable level of image processing makes sure that various photos receive varying degrees of analysis. Every vehicle entering the society would be registered on the system with this parking system. And complete data of the resident's vehicle(s) will be maintained. Every Vehicle when it enters into the Parking area the Number Plate of the Vehicle will be detected using the open cv and the text would be extracted by ocr .the Vehicle number will store on the database and then we assign the parking slot to the user. when the user left the parking area the parking slot which was assign to the user is automatically removed. For the security reasons we come with an idea ,when the user enter the parking slot he would a message to his registered mail id that he was entered, when a vehicle is being driven out of the parameter then the owner will get an immediate message to his registered mail id. Automatic number-plate recognition is a system that uses Tesseract OCR Engine to analyse photos of vehicle licence plates using optical character recognition. It can be applied to current closed-circuit television systems, cameras used to police traffic laws, or cameras specifically made for the job. Using Selenium internet driver recognises a variety of licence plates and parses them to the government website Vahan.nic.comInformation may be retrieved in conjunction with the car and the captcha solution for additional inference and evaluation. For data analysis and live dashboards, the crawled data is translated into organised and unstructured information and kept in

Firebase and MySQL.

INTRODUCTION: We are evolving toward a society with higher-rise structures and towers as a result of the changing planet and large population of today.Due to the huge population, the human mobility increased . This influences the expansion in the number of vehicles which thus influences the parking circumstance. The suggested system has a database with the permit numbers allowed to park on the property. Additionally, this will control the amount of cars in the area. The suggested solution imports the image into Python using OpenCV, then filters it, uses edge detection to discover the number plate, and then uses OCR with EasyOCR to extract the text from the number plate. The device will determine whether or not to open the gate after reading the number.The decision is taken by comparing the number with the database of authorized license numbers. The parking space is assigned to the appropriate car after being compared to the database. The image processing portion of the system used a variety of methods and tools, including image processing, pattern recognition, and character recognition. One of the reasons this particular technology was used was due to how widely it was used in numerous automation industries.. The level of security is raised by the device's ability to inspect the vehicle before allowing it to enter the parking space. For the security reasons we come with an idea ,when the user enter the parking slot he would a message to his registered mail id that he was entered, when a vehicle is went out of the parameter then the owner will get an immediate message to his registered mail id.These features helps in the case of thefts. With sql lite the user details and vehicle details are stored in two tables to achieve the highest form of normalisation. The idea behind this gadget can be applied to toll booths, vehicle registration, and other locations where there is a need for increased security, such as government and specific commercial facilities. This can be applied to automatic car parking systems, traffic monitoring, automatic challan systems for breaking the law, etc.

I. LITERATURESURVEY

1. Automatic detection of vehicle plate numbers using svm,

B Aishwarya,International Journal of Advanced Research and Development, vol. 5, no. 6, 2018.

Aishwarya took into account low-resolution vehicle photos for support vector machine (SVM)-based automated NP identification and recognition. The modelassessed for 150 vehicle licence plates under specific conditions. The necessary input image can be extracted with the use of the masking approach after the photos have been converted to grayscale, binarized, and noise-removal filters. Finally, recognition is accomplished by separating distinct numbers and letters. MATLAB 2010a is used to deploy and synthesise the system. The accuracy of identification is 92.0%, and incorrect results are caused by car licence plates that are overlapping,

blurry, or have different styles and fonts.

2. Performance and analysis of vehicle number plate recognition system using template matching techniques

G.sharma," Journal of Information Technology & Software Engineering, vol. 8, 2018.

the work focuses on Nepali licence plates in order to assess how well the system for identifying licence plates on moving objects performs.) Images taken by a digital camera are processed to reveal the vehicle plate information.For plate detection, a variety of methods are applicable, includes morphological operation, edge detection, and filtering. Using a template that matches standards interconnections and phases correlation, characters are separated for identification, and the outcome is distinguished into 70 70 blocks and correspondence with the repository templet. The characters are split for consistency's sake. The following method is used to evaluate 90 patterns under many situations. The study shows cross-correlation to be more precise than phase correlation after application to multiple pictures. Phase correlation and normalised cross-correlation precision were 63.46% and 67.98%, respectively.

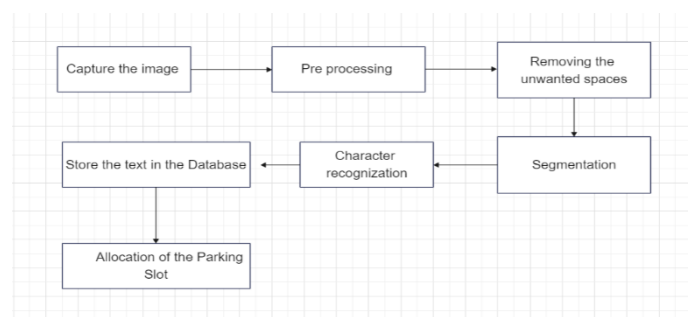## 3. An automatic number plate recognition system using OpenCV and tesseract OCR engine:

A. Agbemenu, J. Yankey, and E. O.

This article discusses a vehicle number plate reader that is tailored to deal with Ghanaian licence plates. The algorithm, which was created in C++ using the OpenCV library, locates the plate by combining mathematical morphology with edge detection and feature identification methods.OCR Tesseract was utilised by them for recognition.

4. This article discusses a vehicle number plate readerthat is tailored to deal with Ghanaian licence plates

This model makes use of a live photo taken by the camera.The characters on the plate are identified once the collected image has been desaturated, filtered, and segmented. The Raspberry Pi handles all processing complexity, and a discernible 3-delay is seen before the final output appears on the LCD.)The database also stores the outcome label.

III.METHODOLOGY

- **Capture the image :** A high definition camera was used to capture the number pad of the car. The image that is taken determines the resolution of the number plate recognition system. The RGB image that was captures was to be changed to a

grey image.

- **Pre processing :** Pre-processing is a set of methods used on the image to enhance the quality of the grayscale to binary image conversion. The image gets smoothed to eliminate noise before its converts to a binary image.

- **Number Plate Localization:** Either a shape analysis method and colour analysis technique is used to retrieve the licence plate. The General License Panel is shaped like a rectangle. So, rectangular-proportioned geometric shapes are sought after by algorithms. Since most licence plates in India are white or yellow, colour analysis is also a viable option. An picture must either be in binary format or the image's edges must be recognised before the rectangle can be found. After that, locate the pertinent rectangle corners and connect to them. After connecting the areas near the box, all rectangular areas of interest are extracted.

- **Removing unwanted Spaces:**The binary filter is first used to remove the undesired image space. To identify the characters in the image, the related component is parsed. The fundamental suggestion is. to scan the image and locate any related pixels. Every element (dot) is identified and removed.

- **Segmentation:** Each character needs to be broken apart after the licence

plate has been extracted. To find the areas in binary digital images for component division, the component label was utilised to view the computer. In order to identify connected pixels and connected pixel cards, the label of connected components scans a pixel-by-pixel image from top to bottom.

- **Character recognition:** The characters in the licencing panel must be match with the existing templates in order to be recognised as characters. The licence number is returned by the recognition process and is saved in a text document in ASCII format. There are two tracks in this recognition procedure. The initial pass involved making an effort to recognise each word individually. Each acceptable word is sent as training data to the adaptive notebook. The adaptive book was given the chance to more precisely understand the content.

- **Store the text in the Database**:After the Text extraction the Text is Stored in the database. Here we Uses Sqllite to Store All the necessary data (the text which extracted using open cv and easy ocr) .

- **Allocation of the Parking Slot**:After the text is Stored ,the Parking Slot whould be allocated to the respective Vechile According to the Vaccancies.

IV. F LOWOFACTIVITY

A. IMPLEMENATATION

The vehicle number will be obtained from the number plate. EASY OCR and OpenCV, together with Google Colab, are two open-source applications that we will use for this project.

Using OpenCV and Haar Cascade to Scan Vehicle License Plates

1. import the car images first so we can start working on them. Since OpenCV only supports BGR format images by default, we must first use cv2.cvtColor to convert the image to RGB before requesting matplotlib to display it.

2. At this point, import the Haar Cascade feature set for Indian licence plates using OpenCV's Cascade Classifier function.

3. The detect Multi Scale function of the Cascade Classifier is then used to perform the detection. Let's take a closer look at open CV's detect Multi Scale method. The method allows us to locate objects of varying sizes in the supplied image and returns a list of all the rectangle parameters where the things were identified. The scale Factor for each image scale determines how much the size of is decreased. Basically, the plate detection models are trained to ignore plates that are larger or smaller and are only capable of detecting objects of a certain size. With the help of MinNeighbors, we can specify the bare minimum number of neighbours a candidate rectangle needs to be considered.being kept. Less detections are made with a higher value, but those that are made are of higher quality and greater precision. Check to see if the model recognises the licence plate by running the automobile plate detection function. if the dish isWhen it is discovered, a red rectangle will be seen around it. After that, the vehicle licence number will be extracted from the plate using OCR.

Using EASY OCR, car number plate recognition and extraction:

We must do some image processing procedures in order to execute OCR correctly. Take a picture of the vehicle's licence plate to get things started. We do this by developing a function that is the same as this one we previously used to detect licence plates, except that this time we will extract , which is the vehicle number plate, as a new image. Additionally, we'll want to increase the vehicle licence plate because it only makes up a small piece of the input image. The output of these two procedures will give us our object of interest, which is the car's licence plate. The image should then be changed from RGB colour to grayscale. In general, by doing this, we are lowering the image's colour palette, which could interfere with OCR detection. Since we need to concentrate more on the image's margins, utilising a greyscale image makes this task easier. We'll now apply the slide to the picture. The smoothness aids in removing image noise and causes the app to concentrate more on the image's finer elements.

This process, known as "denoising," actually makes the characters in a photograph much more distinct and obvious.After using cv2.medianBlur to smooth out the image, the image is now ready for the OCR process. To determine whether or not our detection model is effective, we have imported an image of a car.Increasing the image's size and finding the licence plate so that it is surrounded by a rectangle.region of interest that was extracted, such as a licence plate, Obtaining the Actual Number plate using the whole vehicle image will allow us to do OCR solely on the vehicle's licence plate.

USING sql lite to store the vehicle id:

After the extraction of the number from the number plate the data is stored in the database on the with respect to the registered mail id .and then the parking slot is allocated according to the vaccincies.

Using smtp protocol :

Using the smtp protocol we will send the mail to the registered mail id when the vehicle is drive -in or drive out .

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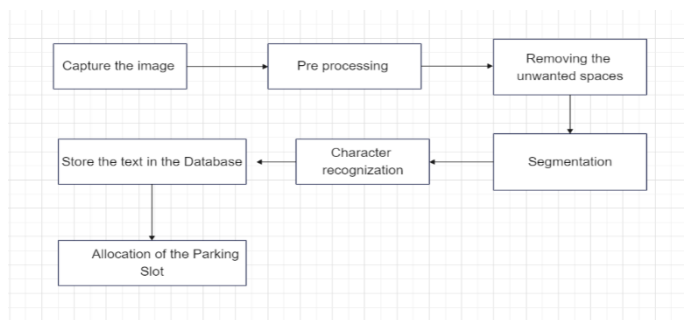
V. SOFTWAREMODULES

1)Python:

Python is an object-oriented and interpretable high-level programming language developed by the Python Software Foundation. It is compatible with a wide range of operating systems and platforms. In addition to that, Python has a method known as dynamic semantics. Because of its dynamic typing and dynamic binding, in addition to the high-level data structures that are already built into it, Rapid Application Development with this language is a highly enticing alternative (RAD). It is also possible to utilise it as a scripting language or glue language, which enables it to connect components that already exist. Because of this, it is an option that offers a great degree of flexibility. Python's syntax is basic and easy to learn, which places an emphasis on readability and, as a result, minimises the cost of maintaining programmes. Readability is the focus of the Python programming language. Python's support for modules and packages, which fosters modularization and makes code more reusable, is an asset for programmers who choose to write their programmes in this programming language. Both the Python interpreter and the whole standard library may be obtained for free download in source or binary form, and there are no restrictions imposed on the distribution of any of these components in any way. This is consistent across the majority

of the prevalent operating systems.

2)EASY OCR:

Easy OCR uses a template matching method and is a font-dependent printed character reader. Any type of brief text (part numbers, serial numbers, expiry dates, manufacturing dates, lot codes, etc.) printed on labels or directly on parts can be read by this device.

3)MySQL:

MySQL is well-known for being the open-source database that is used the most often all around the globe (back-end). Since PHP and MySQL are the open-source scripting and database combination that is used the most commonly, this database provides the best support for PHP. The user interface that WAMP, LAMP, and XAMPP servers give for MySQL is very user-friendly, which helps to cut down on the amount of work that has to be done.

VI. RESULTSANDDISCUSSIONS

The number plate is extracted by using open cv and easy ocr.

Stores the vehicle data with respect to the register mail id

VII. CONCLUSUION AND FUTURE SCOPE

One of the better tools we use for image processing is Open CV, which performs admirably for the vast range of illumination conditions and many types of number plates frequently found in India. Even if there are acknowledged limitations with high resolution to detect the plate utilising Open CV and Python, which is most changeable, it is unquestionably an alternative to the current proprietary solutions.

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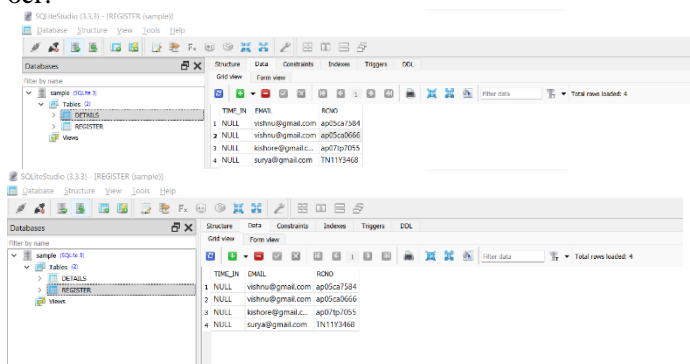
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