CHAPTER-1

Introduction

In last few years, ANPR or license plate recognition (LPR) has been one of the useful approaches for vehicle surveillance. It is can be applied at number of public places for fulfilling some of the purposes like traffic safety enforcement, automatic toll text collection , car park system and Automatic vehicle parking system .

ANPR algorithms are generally divided in four steps:

- Vehicle image capture
- Number plate detection
- Character segmentation
- Character recognition

Automatic number-plate recognition (ANPR; see also other names below) is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data. It can use existing closed-circuit television, road-rule enforcement cameras, or cameras specifically designed for the task. ANPR is used by police forces around the world for law enforcement purposes, including to check if a vehicle is registered or licensed. It is also used for electronic toll collection on pay-per-use roads and as a method of cataloguing the movements of traffic, for example by highways agencies.

Automatic number-plate recognition can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of day or night. ANPR technology must take into account plate variations from place to place.

privacy issues have caused concerns about ANPR, such as government tracking citizens' movements, misidentification, high error rates, and increased government spending. Critics have described it as a form of mass surveillance

We use ANPR (Automatic Number Plate Recognition) technology to help detect, deter and disrupt criminal activity at a local, force, regional and national level. This includes travelling criminals (those using the road network to avoid being caught), organized crime groups and terrorist.

CHAPTER – 2

Literature Survey

- The proposed a system to localization of number plate mainly for the vehicles and segmented the numbers as to identify each number separately. This paper presents an approach based on simple and efficient morphological operation and Sobel edge detection method. He also presents a simple approach to segmented all the letters and numbers used in the number plate. After reducing noise from the input image we try to enhance the contrast of the binarized image using histogram equalization. We mainly concentrate on two steps;
  1. To locate the number plate
  2. To segment all the number and letters to identify each number separately.
- Describe a comprehensive survey on existing (Automatic Number Plate Recognition) ANPR Techniques by categorizing them according to the features used in each stage. Comparisons of them in the terms of Pros, Cons, Recognition results, & Processing speeds were addressed. A future forecast for ALPR was also given at the end. The future research of ANPR should concentrate on multi-style plate recognition, video-based ANPR using temporal information, multi-plates processing, high - definition plate image processing, ambiguous -character recognition.
- Focused a number plate localization and recognition system for vehicles. This system is developed based on digital images and can be easily applied to commercial car park systems for the use of documenting access of parking services ,secure usage of parking houses and also to prevent car theft issues. The proposed algorithm is based on a combination of morphological operation with area criteria tests for number plate localization.
- Paper presents about car plate recognition system.it describes, design algorism and future of implementation. The system has color image inputs of a car and the output has the registration number of that car. The system has three main steps to get the desired information.
  1. Plate localization
  2. Character segmentation
  3. Character recognition.
- First, the number of plate is extracted from the original image, then the characters from it are isolated, and finally each character is recognized. The algorithms were developed using a set of training images. The final program is capable of extracting the desired information in a high percentage of the test images. The method makes use of the rich corner information in the plate area and the edge information of license plates. It can deal with more difficult location problems, especially with a license plate existing in a complicated background.

CHAPTER – 3

Problem Statement

- To create Automatic Number Plate Recognition System and comparing stored vehicle number with therecords of vehicle numbers involved in crimes.

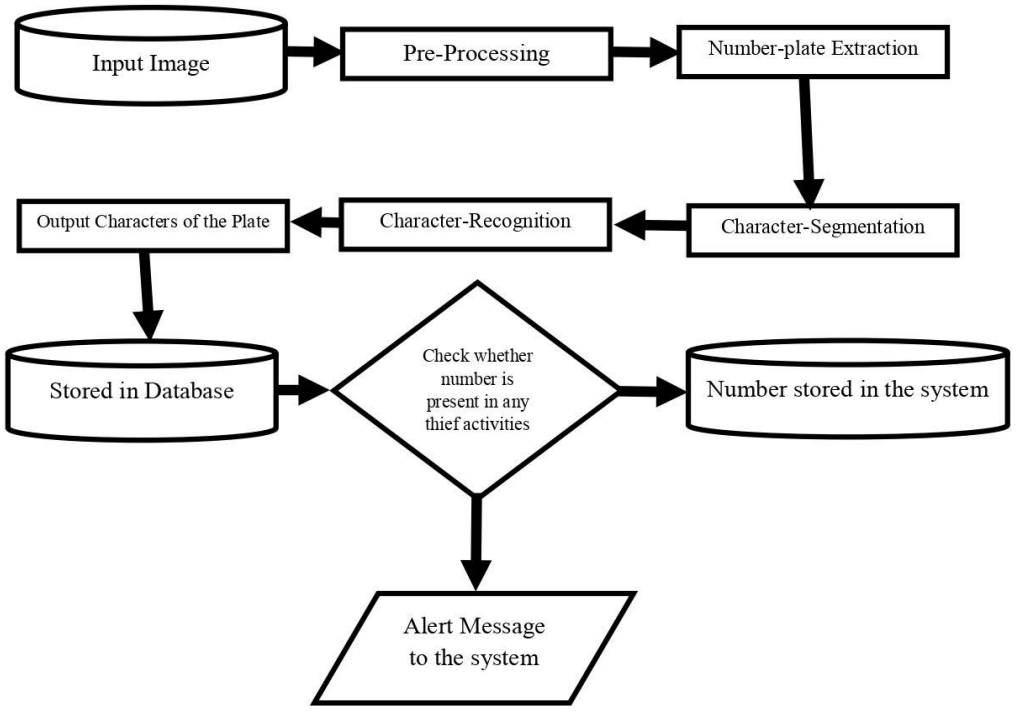
Objectives and proposed system architecture

Objectives:

- The main objective of the Automatic Number Plate Recognition is to check owners details.
- It manages all the information about Cars, Bikes
- It maintains the information about challans, no. of crimes committed.
- It used for parking control systems in big apartments.
- It provides an alert if any crime involved vehicle number is detected.

Proposed System Architecture:

- The proposed architecture is developed on the base of theory of the Communicating Sequential Processes (CSP). from figure, we can say that for the system we must take input image then pre-process the image and number plate Extraction after that by using Character- Segmentation Algo. we can recognize the characters & the number (License Number) is stored in the database for checking the number is present in any thief activities we use the Linear- Regression algo. using this algorithm alert message transfer to the system.



CHAPTER – 4

Modules

1. License Plate Detection

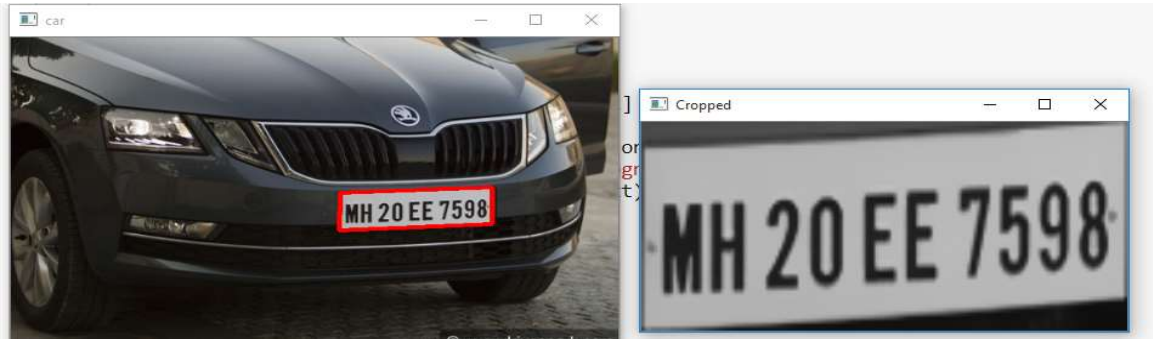
   License plate detection is identifying the part of the car that is predicted to be the number plate. Recognition is identifying the values that make up the license plate.

   License plate detection and recognition is the technology that uses computer vision to detect and recognize a license plate from an input image of a car. This technology applies in many areas. On roads, it is used to identify the cars that are breaking the traffic rules. In security, it is used to capture the license plates of the vehicles getting into and out of certain premises. In parking lots, it is used to capture the license plates of the cars being parked. The list of its applications goes on and on.

2. Character Segmentation

   Character segmentation has long been a critical area of the OCR process. The higher recognition rates for isolated characters vs. those obtained for words and connected character strings well illustrate this fact. A good part of recent progress in reading unconstrained printed and written text may be ascribed to more insightful handling of segmentation. This paper provides a review of these advances. The aim is to provide an appreciation for the range of techniques that have been developed, rather than to simply list sources. Segmentation methods are listed under four main headings. What may be termed the "classical" approach consists of methods that partition the input image into sub images, which are then classified. The operation of attempting to decompose the image into classifiable units is called "dissection". The second class of methods avoids dissection, and segments the image either explicitly, by classification of prespecified windows, or implicitly by classification of subsets of spatial features collected from the image as a whole. The third strategy is a hybrid of the first two, employing dissection together with recombination rules to define potential segments, but using classification to select from the range of admissible segmentation possibilities offered by these sub images. Finally, holistic approaches that avoid segmentation by recognizing entire character strings as units are described

3. Masking Numberplate



In our project the detection of license plate is divided into two phases. First the system is build to which the image is passed the output of the system is image on which the license plate is detected and blurs the license plate. For building the system, the system has to be trained with number of images of license plate. First the original images are cropped to car images before training. Original Image Cropped Image Then using imglab tool in dlib library of python the training images are converted into xml file. The xml files contain the feature data and background data. The data which is annotated is the feature data which we have to recognize in the original image.

4. Optical Character Recognition

   Optical character recognition (OCR) technology is an efficient business process that saves time, cost and other resources by utilizing automated data extraction and storage capabilities.

   Optical character recognition (OCR) is sometimes referred to as text recognition. An OCR program extracts and repurposes data from scanned documents, camera images and image-only pdfs. OCR software singles out letters on the image, puts them into words and then puts the words into sentences, thus enabling access to and editing of the original content. It also eliminates the need for manual data entry.

5. Comparing number with crime records

   After character recognition number plates are stored in the database and comparison with crime records are done

6. Send alert if number matches

   If the extracted number plate matches with criminal record then alert is displayed in the popup window.

CHAPTER – 5

Conclusion

- We conclude that there are different techniques available for recognition of car number plate such as sobel edge detection method, Automatic number plate recognition, Novel method used for detects edge & fill holes less than 8 pixels only, categorize features in each stage, identifying & recognizing car license plate. Therefore at this stage we use improved character segmentation method to reduce effort required for recognizing vehicle license number plate. There is an immediate need of such kind of Automatic Number Plate Recognition system in India as there are problems of traffic, stealing cars etc. Government should take some interest in developing this system as this system is very economical and eco-friendly, if applied effectively.This change will help in the progress of the nation.

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