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LICENSE PLATE RECOGINITION SYSTEM WITH K-NN ALGORITHM

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Abstract: License Plate Recognition is the most important in now a day, because rapidly increasing transportation systems which are more difficult to manage and monitor humans to follow traffic rules and regulations .mostly of the cases such as high speed detection, violation of light, security etc. The purpose of this paper is that introduce License Plate Recognition (LPR) that a computer system that automatically recognizes any digital image on the license plate. This system include various operation such as taking picture and giving input image, by having the region of interest taking license plate nd perform some of the morphological techniques such as edge detection, segmentation and feature extraction and OCR for any alphanumeric character and each character is identified by open computer vision library. This has been implemented in K-NN algorithm and Python Programing lang

1. Introduction

License Plate Recognition is a method which is developed using Machine Learning Algorithm that's K-NN algorithm and uses optical character Recognition (OCR) which is used to convert the image into text format. The Working process of License Plate Recognition includes four major steps. Coming to first step camera captures vehicle image and give it as input to the system where as in second step based on the Region of interest(ROI) detect and extraction of number plate from the captured image. In third step it performs some of the morphological techniques such as Edge detection, character segmentation and feature extraction. Finally in fourth step recognition character And generate accurate license plate as output as shown in fig (1).
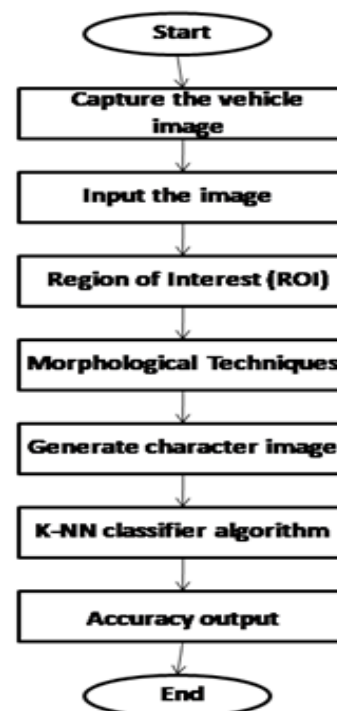

Fig (1) Flow diagram for License plate recognition

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2. Literature survey:

License plate recognition system was developed by using the machine learning algorithm is K-NN (K-nearest neighbors)

K-nearest neighbors (KNN) algorithm uses 'feature similarity' to predict the values of new data points which further means that the new data point will be assigned a value based on the points in the training set how closely it matches. We can understand its working with the help of following steps

- **Step 1** − we need dataset For implementing algorithm,. So during the first step of KNN, we must load the training as well as test data.

- **Step 2** − Next, we need to choose the value of K i.e. the nearest data points. K can be any integer.

- **Step 3** − For each point in the test data do the following −

- **3.1** − Calculate the distance between test data and each row of training data with the help of any of the method namely: Euclidean, Manhattan or Hamming distance. The most commonly used method to calculate distance is Euclidean.

- **3.2** − Now, based on the distance value, sort them in ascending order.

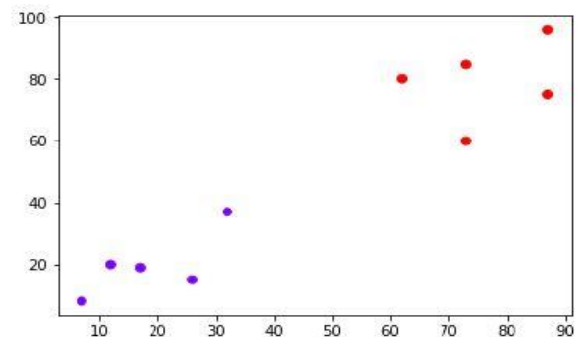- **3.3** − Next, it will choose the top K rows from the sorted array.

- **3.4** − Now, it will assign a class to the test point based on most frequent class of these rows.
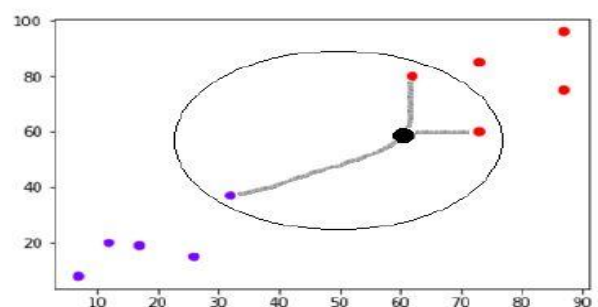
- **Step 4 –** End

Example

- The following is an example to understand the concept of K and working of KNN algorithm −

Suppose we have a dataset which can be plotted as follows

- Now, we need to classify new data point with black dot (at point 60,60) into blue or red class. We are assuming K = 3 i.e. it would find three nearest data points. It is shown in the next diagram –

We can see in the above diagram the three nearest neighbors of the data point with black dot. Among those three, two of them lines in Red class hence the black dot will also be assigned in red class.

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3. Existing System:

Searching for license plate recognition is still a challenge. Where there is a technique call sobel filter technique. It works on edge detection Edge Detection is simply a case of trying to find the regions in an image where we have a sharp change in intensity. It takes the horizontal edge and vertical edge character of number plate. By this accuracy of the number plate is missing and sometimes it provides invalid output of the captured number plate.

4. Proposed system:

The main idea of this system is to design and develop using machine learning algorithm and provide the accurate output by using K-NN algorithm which is more essay and efficient to use and apply it. The processes that involves that is, initially camera the vehicle image and give it as input image to the system and based on the region of interest it takes the license plate image and apply the morphological techniques. That is:

- Edge detection
- Segmentation
- Feature extraction

4.1 Edge detection:

In edge detection it will take an image by using some of the filters and come to know those areas of an image contain edges by this image clarity will be increase

4.2 Segmentation:

Segmentation is of two types: Horizontal Segmentation, Vertical Segmentation. Where as in horizontal segmentation it removes unwanted background data and in vertical segmentation it segments the each character from the license plate image .i.e., it divides the each character as individual character from license plate. In feature extraction the segmented data is extracted.

Here data is trained with different font styles and numbers are trained using k-NN algorithm. Here applying optical character recognition (OCR) for each segmented character images are converted into text format.

Finally each character is comparing with the trained data and matches and generates the license plate output in most accurately.
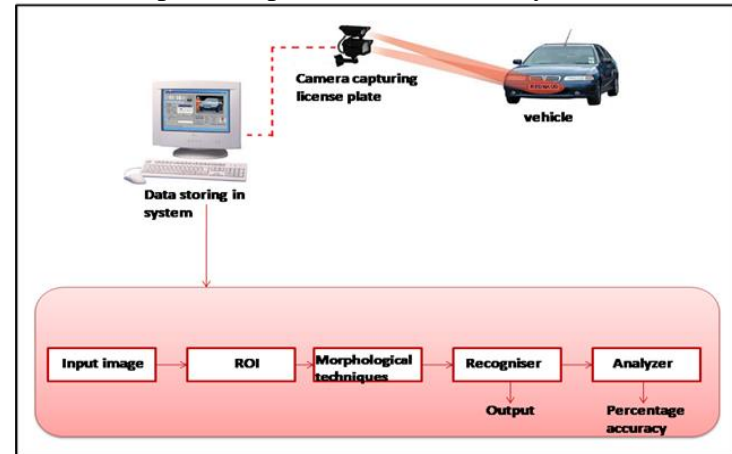

Fig (2) System model for license plate recognition

Fig (3) detecting and extracting number plate and showing output

Applying morphological techniques

5. Conclusion:

After research has been performed on detection and recognition of license plate. There are several methods and techniques for this process have been done. However, every technique has its own advantages and disadvantages. The proposed system provides higher percentage of accuracy that has been obtained to show the significance of this approach along with the characters on the plate stored in an image format.

6. Future Enhancement:

In future Enhancement, an image capturing cameras is installed near Traffic signal points, highway speed detection, and violation of light. The over-ruled vehicles are captured and the further license plate recognition process is done using our proposed module to get the license plate accurately

7. Reference:

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