

Character Recognition By Extraction Method

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Abstract- In ANPR the Extracted license plates square measure divided into individual characters by employing a region-based technique. the recognition theme combines adaptative reiterative thresholding with a guide matching rule. The strategy is powerful to illumination, character size and thickness, skew and tiny character breaks. The most blessings of this method is its period of your time capability which it doesn't need any extra detector input (e.g. from IR sensors) except a video stream. This method is evaluated on an outsized sort of car pictures and videos [10]. The system is additionally computationally terribly economical and it's appropriate for others connected image recognition applications. this technique has wide range of applications like access management, tolling, petrol, control, finding taken cars, etc. what's more, this technology doesn't would really like any installation on cars, like transmitter or communicator.

Keywords- IR sensors, ANPR, Extracted license plates.

I. INTRODUCTION

The escalating increase of up to date urban and national road networks over the last three decades emerged the necessity of efficient monitoring and management of road traffic. Conventional techniques for traffic measurements, like inductive loops, sensors or EM microwave detectors, suffer from serious shortcomings, expensive to put in, they demand traffic disruption during installation or maintenance, they're bulky and that they are unable to detect slow or temporary stop vehicles. On the contrary, systems that are supported video are easy to put in, use the prevailing infrastructure of traffic surveillance. Furthermore, they will be easily upgraded and that they offer the pliability to revamp the system and its functionality by simply changing the system algorithms. Those systems allow measurement of vehicle's speed, counting the amount of vehicles, classification of vehicles, and therefore the identification of traffic incidents (such as accidents or heavy congestion) [13]. There is a good sort of systems supported video and image processing employing different methodologies to detect vehicles and objects.

II. BASIC METHOD USED IN SURVEILLANCE

A typical closed-circuit television consists of a traffic camera network, which processes captured traffic video on-site and transmits the extracted parameters in real time. Here our focus is on the study of algorithmic a part of such a system. During this thesis, we present full-featured vehicle detection, tracking and car place recognition system framework, particularly designed to figure on video footage [8, 9]. This technique mainly having four modules:-

- i. Video Acquisition
- ii. Vehicle Detection and Tracking
- iii. Car Place Extraction
- iv. Character Recognition Unit

Automatic Number Plate Recognition

Automatic number plate recognition (ANPR) may be a mass surveillance and cataloguing the movements of traffic or individuals and also for traffic enforcement. ANPR are often wont to store the pictures captured by the cameras also because the text from the car place. ANPR technology tends to be region specific, due to plate variation from place to put. Concerns about these systems have centered on privacy fears of state tracking citizens' movements, mis-identification, and high error rates and increased government spending [12, 9]. The system is meant for real time videos where a camera is employed for continuous recording of videos. The view of camera or the world covered by camera is fixed between entry zones and exist zone. Each frame is continuously processed to see the presence of a vehicle. An outlined connected component area is taken as threshold; if the detected area is above that threshold value then it'll be recognized as a vehicle and can be tracked [5].

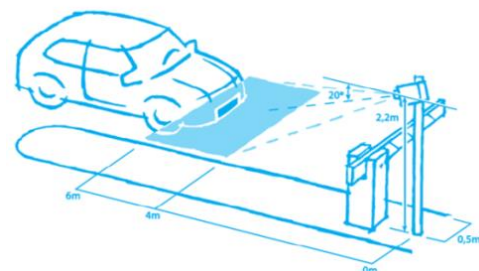


Fig-1 ANPR system implementation in practical scenario

A distance is defined between the vehicle and therefore the camera and when the vehicle comes within that range i.e. vehicle's connected component area is maximum, these frames of video are passed to car place recognition algorithm. Then recognition of character takes place and data is stored and compare with data base.

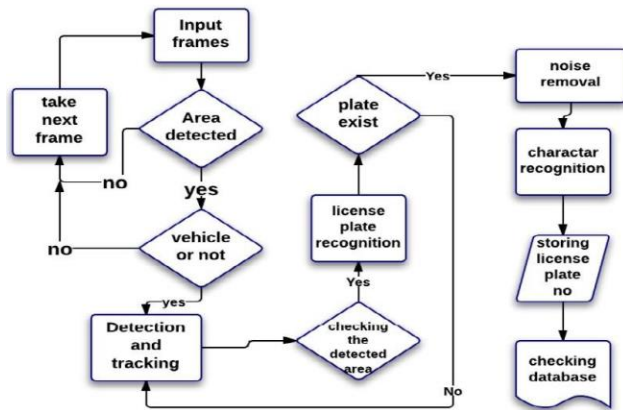


Fig-2 Flow Chart of the System

This Proposed System having mainly four modules:

- i. **Video Acquisition**– During this module videos are taken by the static camera situated at traffic scenario. A camera network that has the power to transmit images in real time to a central operational centre. The processing of the pictures are often administered on-site saving valuable network bandwidth because it transmits only the result of the calculations. The entire process also can be performed either in real time video streaming from an operational centre or in already stored video material.
- ii. **Vehicle Detection and Tracking**– In vehicle detection we've simulated various background subtraction techniques available within the literature. The background subtraction technique should overcome the issues of varying illumination condition, background clutter, camouflage and shadow. Motion segmentation of foreground object has been wiped out real time. It's hard to urge this complete problem solved in one background subtraction technique. Therefore the idea was to simulate and evaluate their performance on various video data taken in several situations ^[1,3].
- iii. **License Plate Extraction**- License plates are first located in current frame then they're extracted using various available techniques within the literature supported Hough Transform method, Template matching technique, Region growing algorithm,

Histogram Approach and Edge Detection Approach ^[5, 12].

- iv. **Character Extraction**– Images of the extracted plates are the input to the present module. Here first car place image is cropped in lines, and then characters are segmented and recognized.

III. PROPOSED METHODOLOGY

In this paper he overviewed the matter of auto Number Plate recognition with various sorts of Number Plates. The system has been tested on MATLAB environment with satisfactory results. Most of the time the input image taken from low-resolution mobile camera which doesn't have excellent quality image output ^[5, 10].

Given a far better device the result should increase in accuracy significantly. Edges in a picture are calculated by either horizontal or vertical edge detection methods ^[3]. It's necessary for the Localization algorithm to yield high accuracy because the Character Recognition Technique would be ineffective if the amount Plate isn't localized correctly. Then the most challenge in image deskewing is to calculate the angle at which the amount plate is rotated or skewed ^[4].

Optical character recognition using feature extraction

This algorithm uses the very fact that each character has unique set of features like corners, ending and bifurcations. Inheriting these features makes the algorithm fast and fewer complicated. The input character is converted to edge image and therefore the features are extracted from it in iterative process. Every character has unique lines or slopes when observed from the boundary of the segmented character image.

This methodology uses this feature to acknowledge the characters. After the character is segmented out, it's resized in such how that the character touches from all sides to the boundary. Features are extracted here by Optical Character Recognition (OCR) method. There are three features in each of the characters.

- X1=Numbers of Triangle
- X2=Numbers of Square
- X3=Numbers of Corner
- X4=Numbers of Pore
- X5=Numbers of End
- X6=Positions of Ends

Table 1: Recognition of Alphabets or Numeric Digits from Image

ALP.	X1	X2	X3	X4	X5	X6
0	0	0	0	1	0	0
1	1	0	1	0	3	113
2	0	0	1	0	2	13
3	1	0	0	0	3	111
4	0	1	2	1	2	34
5	0	0	2	0	2	13
6	0	0	0	1	1	3
7	0	0	1	0	2	14
8	0	1	0	2	0	0
9	0	0	0	1	1	1
A	2	0	1	1	2	44
B	2	0	2	2	0	0
C	0	0	0	0	2	33
D	0	0	2	1	0	0
E	1	0	2	0	3	333
F	1	0	1	0	3	334
G	0	0	2	0	2	134
H	2	0	0	0	4	2244
I	2	0	0	0	4	1133
J	0	0	1	0	2	11
K	0	1	0	0	4	2244
L	0	0	1	0	2	23
M	0	0	3	0	2	44
N	0	0	2	0	2	24
O	0	0	0	1	0	0
P	1	0	1	1	1	4
Q	1	0	0	1	1	4
R	2	0	1	1	2	44
S	0	0	0	0	2	13
T	1	0	0	0	3	134
U	0	0	0	0	2	22
V	0	0	1	0	2	22
W	0	0	3	0	2	22
X	0	1	0	0	4	2244
Y	1	0	0	0	3	224
Z	0	0	2	0	2	13

Conversion of alphabets or numeric digits into binary

Table 2: Conversion of Characters into Binary Format

ALP.	S. No.	Binary of S. No.
0	1	1
1	2	10
2	3	11
3	4	100
4	5	101
5	6	010
6	7	111
7	8	1000
8	9	1001
9	10	1010
A	11	1011
B	12	1100
C	13	1101
D	14	1110
E	15	1111
F	16	10000
G	17	10001
H	18	10010
I	19	10011
J	20	10100
K	21	10101
L	22	10110
M	23	10111
N	24	11000
O	25	11001
P	26	11010
Q	27	110110
R	28	11100
S	29	11101
T	30	11110
U	31	11111
V	32	100000
W	33	100001
X	34	100010
Y	35	100011
Z	36	100100

If the Character isn't found it means the amount plate isn't following the principles of Traffic or there's no number within the plate or there's no plate.

IV. COMPARISON AND ANALYSIS

The results of the localization process given by Bhavin V. Kakani are 96.7% whereas the character recognition technique is 92.2% Accuracy for ANN using Feature extraction [3]. The entire Automatic Number Plate Recognition System Gives the Accuracy given by-

$$= \frac{96.7\% + 92.2\%}{2} = 94.45\%$$

In the proposed technique the localization process is kept same [3]. Within the proposed character recognition technique there's an obstacle that Digit '0 (Zero)' and alphabet 'o' is analogous. Hence this method gives 97.2 % Accuracy, but it's not a severe problem because consistent with Indian car place System 1st two characters are Alphabets, 2nd two are numeric digits 3rd two are Alphabets again and last 4 digits are Numeric digits. in order that Zero and Alphabet o could also be clearly separated out.

The following sections are dedicated to describing the simulation process and its results. The outline will include the simulation environment, the simulation process, and therefore the results of comparing the performance of directed diffusion with the proposed protocol. Our goal during this study is to verify the operation of our proposed method. For this purpose we've used MATLAB to functioning. Firstly we define function for extracting the features of characters.



Fig-4 MATLAB Result Window that shows noise in image test

V. CONCLUSIONS

Therefore within the proposed character recognition technique we achieve 100% accuracy by defining the situation of the characters. There's a Now the entire Automatic Number Plate Recognition System Gives the Accuracy given by-

$$= \frac{96.7\% + 100\%}{2} = 98.35\%$$

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