

Integration of Towing Abandoned Vehicles with Number Plate Recognition System

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Abstract:

E-government, necessity for good and corruption free nation, means by using information and communication technologies, especially internet, to achieve better government by delivering public services and processing internal works in government in a much more suitable, customer leaning and cost effective. Like other e-government related services e-police system is also an e-government related service which makes the communication process a possibility, a great success for modern era with increasing the professional efficiency for the government's police administrations. We proposed a design of e-police system for traffic police to help towing management. Basically, owner has no problem if its abandoned vehicle is getting carried by traffic police, but he/she wanted a notification of same. So that user will not get panic and his vehicle will be safe. We wanted to provide a good solution to this problem via integrating this with image

processing. Our work will definitely help the police system in making the police work more efficient.

Keywords: Number plate localization; Morphological operation; Character segmentation; Thresholding; Edge detection.

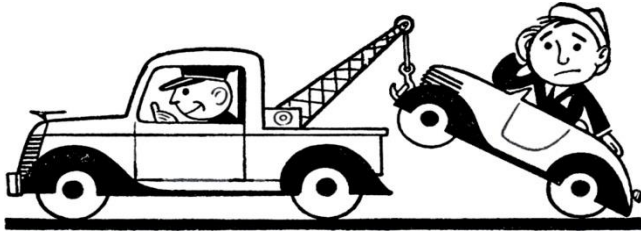
Introduction:

Traffic Police Tow/Carry abandoned vehicles without notifying vehicle owner. Owner gets panic when he came to know after a long time. Even Towing people don't give exact info what which police station the owner should contact. We will use the image as input which is taken by towing contractor in our system to extract the vehicle number so that system can immediately send a notification to vehicle owner about his/her mistake. The Notification will also help owner to find the nearest police station where he/she can approach to release his/her vehicle. The System will also decide how much fine should be taken from owner. If we

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park our vehicle in non parking area, traffic police will tow our vehicle.



Problem Statement:

- Traffic Police Tow/Carry abandoned vehicles without notifying vehicle owner.
- Owner gets panic when he come to know after a long time
- Even Towing people don't give exact info what which police station the owner should contact.

Goals and Objectives:

- We wanted to provide a good solution to this problem via integrating this process with image processing.
- As a evidence, towing contractor takes a photo of owner vehicle to prove that his/her vehicle was not parked correctly.
- We wanted to use that image as input in our system to extract the vehicle number so that system can immediately send a notification to vehicle owner about his/her mistake.
- The Notification will also help owner to find the nearest police station where he/she can approach to release his/her vehicle.

Existing System:



Fig(a): Existing system of towing vehicles.

Disadvantages of Existing System:

1. Vehicle owner gets panic because traffic police carry abandoned vehicles without notifying vehicle owner.
2. Vehicle gets damage due to improper handling.

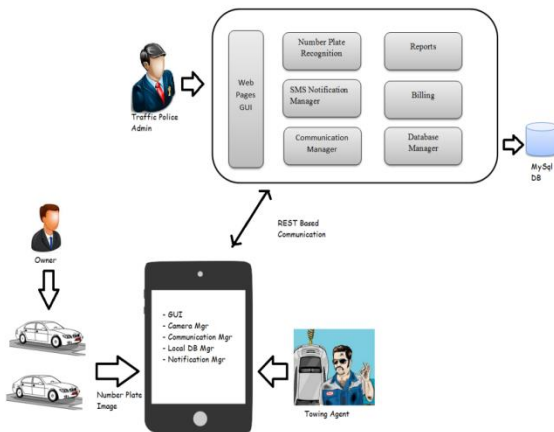
Proposed System:

Here the system will be based on Client Server architecture. Towing agent will have take photo using smart phone, where this photo will be send to server. Server will extract number from images using “Number Plate Recognition” technique. Then server track vehicle owner’s information on the basis of vehicle number. Server will send SMS notification to owner saying his/her vehicle has been deposited into some nearest police station. When the user came to withdraw his/her vehicle, server will calculate the fine. Server will send SMS receipt to user of vehicle for his/her payment.

System will support 3 user roles :

1. **Traffic Police Admin :** Access via Web
2. **Towing Agent :** Access via Smart Phone
3. **Vehicle Owner :** Access via Web

Architecture:



Fig(b) : Architecture of towing system

1. Number plate recognition:-

It will manage recognition of the number plate.

2. Communication Manager:-

Communication Manager will handle the communication between client side and server side.

3. Web GUI:-

It means that the majority of the logic runs on the server side.

4. SMS Notification manager:-

SMS notification manager will handle SMS notifications. SMS will be send to user

saying that his/her vehicle has been deposited into some nearest police station.

5. Billing:-

It will handles all payment details of every user.

6. Database Manager:-

Database manager manages the database of the system.

7. System Configuration:-

System configuration handles all the configuration files of the system.

8. Camera Manager:-

It will capture and manage number plate images.

• Recognition of Number Plate:

1. Image Capture and Pre-processing:

The images will be stored as colour JPEG format on the camera. Next, we will to convert the vehicle JPEG image into gray scale format. Input of this system is the image captured by a camera placed at a distance of 1-2 metres away from the vehicle as shown in following



When an image is acquired, there may be noises present in an image. These noises affect the recognition rate greatly. So these noises should be removed from the images. To remove noise from the image FIR filters are used so that image becomes free from noise.



- iii. Now we can detect an area of the number plate according to a statistics of the snapshot using vertical projection of an image into the axes x and y .

The vertical projection of the image is a graph, which represents an overall magnitude of the image according to the axis y :

2. Plate region extraction.

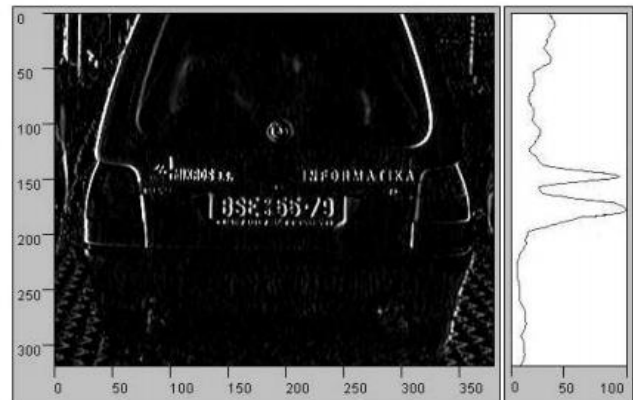
The goal of this phase, given an input image, is to produce a number of candidate regions, with high probability of containing number plate and validate for true number plate.

- i. Image binarization: Covert gray scale image into binary image using Otsu's method.
- ii. Edge Detection : Sobal Operator

1. Sobal Edge Detection



3. Vertical edge detection



2. Segmentation of character in the extracted number plate.

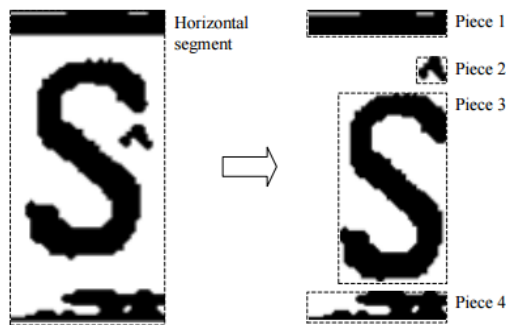
The segment usually contains several pieces. One of them represents the character and others represent redundant elements, which should be eliminated. The goal of the piece extraction algorithm is to find and extract pieces from a segment of the plate.



This can be done using “horizontal segmentation” technique.

Since the segment has been processed by an adaptive thresholding filter, it contains only black and white pixels. The neighboring pixels are grouped together into larger pieces, and one of them is a character.

The OCR is now used to compare the each individual character against the complete alphanumeric database. The OCR actually uses correlation method to match individual character and finally the number is identified and stored in string format in a variable.



3. Comparison with database.

In this step get the o/p of extracted number plate using labelling components, and then separate each character and split the each and every character in the number plate image by using split and also find the length of the number plate, then find the correlation and database if both the value is same means it will generate the value 0-9 and A - Z, and finally convert the value to string and display it in edit box, and also store the character in some text file in this code

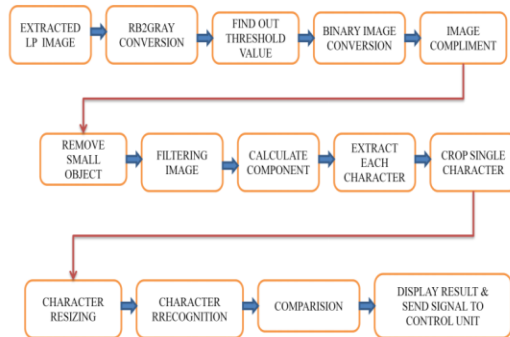
Software Interfaces:

1. Operating System : Windows 7
2. Front End : Java 7
3. Back End : MySQL 6
4. Tomcat 7
5. JDK 1.7
6. Android SDK
7. Eclipse Indigo

Hardware Interfaces:

1. Processor – Intel Core2Duo, Pentium – III/i3
2. Speed – 2.4 GHz
3. RAM - 1 GB (min)
4. Hard Disk - 50 GB
5. Android 2.3 enable handset

Flow of the Project:-



Advantages of proposed System:

- The vehicle user get the exact information about his/her vehicle.
- Can Easily Integrate with existing system.
- More Secure.
- Easy deployment.
- Low cost.
- Used in real time trac application system.

Conclusion:

We provide a good solution to problem via integrating this with image processing and notification will be sent to vehicle user. An efficient less time consuming vehicle number plate detection method is proposed which performed on complex image. By using, Sobel edge detection method here detects edges and fills the holes less than 8 pixels only. To extracting the license plate we remove connected components less than 1000 pixels. Our proposed algorithm is mainly based on Indian automobile number plate system. Extraction of number plate accuracy may be increased for low ambient light image.

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