# AUTOMATIC NUMBER PLATE RECOGNITION SYSTEM THROUGH SMART PHONE USING IMAGE PROCESSING

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**Abstract***: The proposed ANPR algorithm is implemented and simulated using Android SDK on a smart phone. Android platform has gained popularity in recent years in terms of market share and number of available applications. Android operating system is built on a Linux kernel with built-in services such as email, web browser, and map applications. Here, automatic number plate recognition (ANPR) has to be designed and implemented on Android mobile phone platform. First, the graphical user interface (GUI) for capturing image using camera will be developed to acquire vehicle plate number in India. Second, the pre-processing of raw image will be done using contrast enhancement, filtering, and straightening. Next, an Optical Character Recognition (OCR) using neural network was utilized to extract texts and numbers. The highest recognition accuracy. The fastest processing speed. The most type of number plate it can handle.ANPR has two technological issues: The quality of license plate recognition s/w with its applied recognition algorithms. The quality of image acquisition technology, the camera and the illumination. The key factor is the number plate recognition s/w.correct recognition of vehicles violating traffic rules and regulations is a major challenge in the present complex traffic environment. The technologies use for developing this project based on JAVA,Android andPhP.*

**KEYWORDS***: Automatic number-plate recognition, Image processing techniques, Character recognition,Automatic vehicle identification system,optical Character Recognition, Neural nets.*

## I. INTRODUCTION

Automatic Number Plate Recognition using Image Processing Techniques is a system to automatically detect, recognize and identify a vehicle details .It involves low-level image processing techniques & higher level artificial intelligence techniques.Violation of traffic rules and regulations increased by the vehicles. The detection of the vehicles violating traffic signals is a major problem. ANPR acts a solution for the above problem. Automatic Number Plate Recognition (ANPR) is a systemconsist of hardware and software which have the ability to read the character and number on the vehicle's license plate. The ANPR is an image processing technique to extract the image of license plate on vehicle taken by digital camera or taken by either a color or a grayscale digital camera, as well as an infrared camera in order to identify the vehicles using their number plate through optical character recognition (OCR).The ANPR system recognizes character the license plate
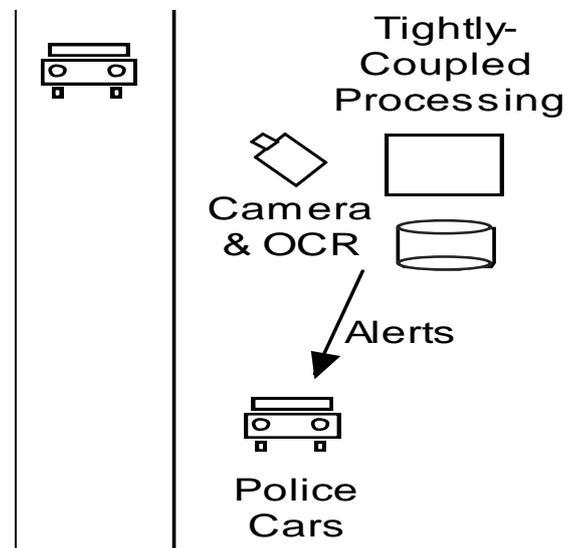
through the combination of various techniques and algorithms, namely image pre-processing, object detection and character recognition. The ANPR system consists of a camera to detect the number plate object and processing unit to process and extract the characters and interpret the pixels into numerically readable characters. Furthermore, it became much exciting in the last decade along with the improvement of digital camera technology and the computational processing . Nowadays, the ANPR system has been used in traffic law enforcement, including speed prosecution, stolen car detection and border monitoring. It can be applied also for building management, such as parking lots and gate control. Commonly, the ANPR systems are being used for various access control and traffic law enforcement, namely toll gate access, parking area access, speed trap and traffic light tress passing.



**Figure.1 Working of ANPR**

## II. LITERATURE SURVEY

[1]Sheng-Wen Chen, Chung-Huang Yang and Chien-Tsung Liu, "Design and Implementation Of Live SD Acquisition Tool in Android Smart Phone", 2011 Fifth International Conference on Genetic and Evolutionary Computing, pp. 157–162, IEEE Computer Society, 2011.

[2] "What is Android?", android developer, http://developer.android.com/guide/basics/what-is android.html, retrieved 2011-2012.

[3]. Neng-Sheng Pai, Sheng-Fu Huang, Ying-Piao Kuo1, Chao-Lin Kuo, "License Plate Recognition Based on Extension Theory," 2010 International Symposium on Computer, Communication, Control and Automation, pp. 164–167, IEEE 2010.

[4]Muhammad Tahir Qadri and Muhammad Asif, "Automatic Number Plate Recognition System for Vehicle Identification Using Optical Character Recognition", 2009 International Conference on Education Technology and Computer, pp. 335–338. 2009.

[5]. Ondrej Martinsky, "Algorithmic and Mathematical Principles of Automatic Number Plate Recognition Systems", Brno University of Technology, pp. 20–23, 2007

[6]. Thanongsak Sirithinaphong and Kosin Chamnongthai, "The Recognition of Car License Plate for Automatic Parking System", Fifth International Symposium on Signal Processing And its Applications, ISSPA '99, Brisbane, Australia, 22-25 August, 1999.

[7]. S. Thanongsak, and C. Kosin, 1998, "Extracting of Car License Plate Using Motor Vehicle Regulation and Character Pattern Recognition," Proceedings of the 1998 IEEE APCCAS '98 Asia-Pacific Conference on Circuit and Systems, pp. 559-562, November 24-27, 1998.

## III. PROPOSED WORK

The overall ANPR system can be subdivided into the software design and hardware design. In this section will discuss the both designs in detail.

## A. Software Design :

The important part of this system is the software design. The software design requires a series of image processing techniques.

The ANPR algorithm is divided into four parts:

➢ Capture vehicle number plate image
➢ Image pre-processing and filtering
➢ Segmentation of the number plate image
➢ Recognize the numbers plate image using OCR algorithm.

•**Capturing of Image:**

The first step is capturing of an image using the camera in the mobile phone. The images are captured in RGB format so it can be further processed easily for the number plate segmentation.

•**Pre-processing and filtering:**

It involves the following process:

The processing time is proportional to the size of the input images. So the foremost task involves reducing the image size by performing image normalization. The images have been normalized to 300 per millisecond resolutions. Image normalization reduces the size of the image and defines a fixed image size standard.The images occupy three channels need to be converted to a single channel ie. Red,Blue,Green.This is done by the conversion of images. The gray scale images only contain the intensity information with white and black lying on the two extremes. For the conversion of images to gray scale cvCvtColor() library function is used with CV_RGB2GRAY. The gray scale converted images are presented and configured. Various blurring techniques are present including Gaussian, Median and Kalman using these removes the noise and reduces sharp edge in the image. These techniques gives a image in an water color image of the real image, removing the sharp edge and discontinuities that are present within the image.
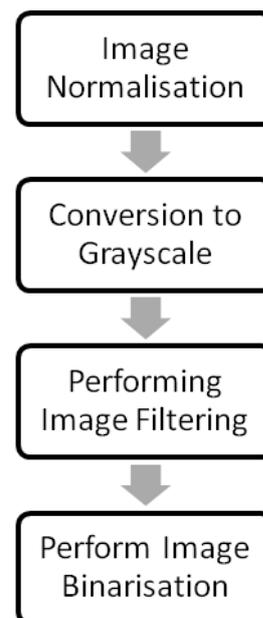
**Figure.2 Image Pre-processing and Filtering**

Among those techniques, Gaussian filter has a better performance. This complexity can be reduced by reducing the 2D Gaussian function parameter. In the current case, Gaussian function is used.

•**Segmentation Process:**

The algorithm of segmentation basically finds the maximum peak in the graph of vertical projection iteratively.If it meets some additional conditions, such as height of peak, the algorithm then zeroes the peak and this process will repeat until no next space is found.

•**Recognization of Image using OCR algorithm:**

The final step is recognizing the character using Optical Character Recognition (OCR) algorithm by compares the image character that we have in second step against the alphanumerical database that we trained using artificial neural network (ANN) algorithm approach.

## OCR algorithm :
Canney algorithm

## B. Hardware Design :

The hardware design is all consisting in mobile phone device, including camera to capture the image of number plate, central processing unit which is inside the mobile phone to process the ANPR algorithm using android mobile phone with Specification.
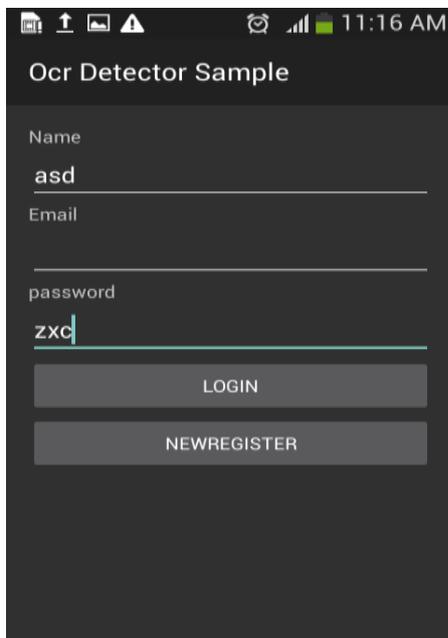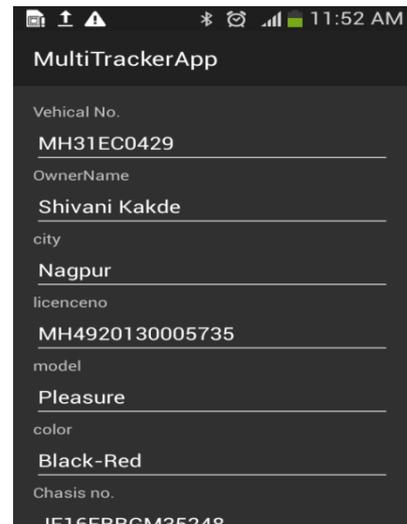
### IV.RESULTS



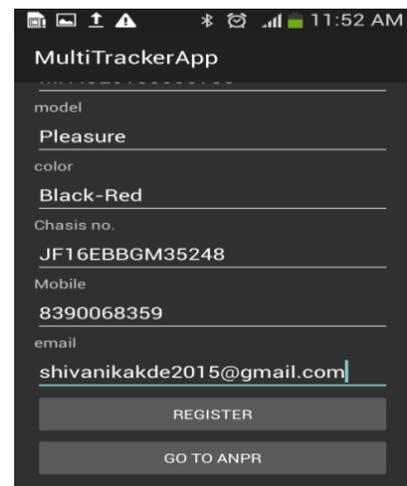**Figure 3 Login Page**



**Figure4.1. Registration**



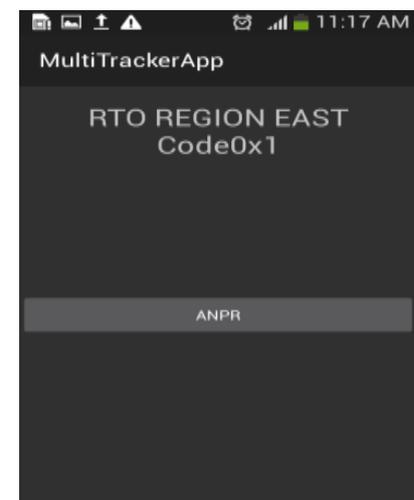**Figure 4.2.Registration**
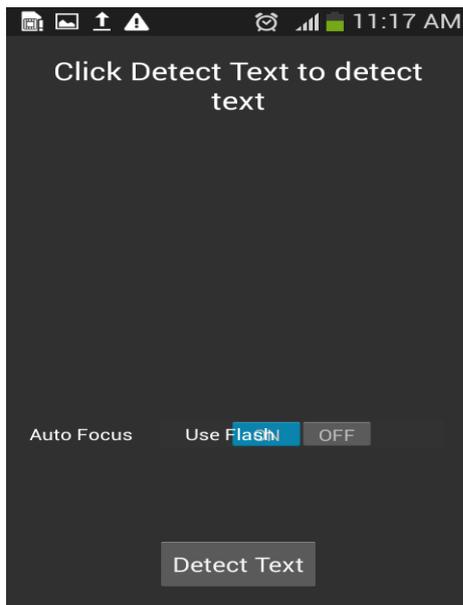


**Figure 5.ANPR Tracker**

**Figure 6.Detector**



**Figure 7.Image Detection**

### V.CONCLUSION

This paper has generally discussed the design and implementation of automatic number plate recognition (ANPR) on android mobile phone platform. The proposed system can be redesigned for multinational vehicle license plate in future. This ANPR algorithm has been tested over a wide range of images yielding a high accuracy rate.

### VI.REFERENCES

[1]Sheng-Wen Chen, Chung-Huang Yang and Chien-Tsung Liu, "Design and Implementation Of Live SD Acquisition Tool in Android Smart Phone", 2011 Fifth International Conference on Genetic and Evolutionary Computing, pp. 157–162, IEEE Computer Society, 2011.

[2] "What is Android?", android developer, http://developer.android.com/guide/basics/what-is android.html, retrieved 2011-2012.

[3]. Neng-Sheng Pai, Sheng-Fu Huang, Ying-Piao Kuo1, Chao-Lin Kuo, "License Plate Recognition Based on Extension Theory," 2010 International Symposium on Computer, Communication, Control and Automation, pp. 164–167, IEEE 2010.

[4]Muhammad Tahir Qadri and Muhammad Asif, "Automatic Number Plate Recognition System for Vehicle Identification Using Optical Character Recognition", 2009 International Conference on Education Technology and Computer, pp. 335–338. 2009.

[5]. Ondrej Martinsky, "Algorithmic and Mathematical Principles of Automatic Number Plate Recognition Systems", Brno University of Technology, pp. 20–23, 2007.

[6]Thanongsak Sirithinaphong and Kosin Chamnongthai, "The Recognition of Car License Plate for Automatic Parking System", Fifth International Symposium on Signal Processing And its Applications, ISSPA '99, Brisbane, Australia, 22-25 August, 1999.

[7]. S. Thanongsak, and C. Kosin, 1998, "Extracting of Car License Plate Using Motor Vehicle Regulation and Character Pattern Recognition," Proceedings of the 1998 IEEE APCCAS '98 Asia-Pacific Conference on Circuit and Systems, pp. 559-562, November 24-27, 1998.
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