

## NUMBER PLATE RECOGNITION: A BRIEF OVERVIEW

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**Abstract:** *Recent year, due to people's life and citizen's income is increasing continuously, cause general individuals possess the vehicle rate is increasingly high, notwithstanding the administration spread energetically decrepit movement, the car is a marker of way of life as well as is an instruments of take transportation and neglected for individuals. So vehicles administration of parking areas, electronic toll accumulation administration of parkway, finding vehicles stolen and screen of street et cetera, all turn out to be new security interest for individuals with vehicles administration and vehicles stolen stay away from And in this paper will concentrate on the different issues required all the while.*

**Index Terms:** *Software Engineering, Software Development, COCOMO model, COCOMO II Model.*

### I. INTRODUCTION

In the traffic aspect, to anticipate of traffic accident [1] and search for of vehicles stolen, because of number of police person is not enough, if only utilize person to recognize the license plate number, we will couldn't achieve the objective quickly, along these lines to set up a programmed license plate acknowledgment system, we can tracking the experience vehicles as well as spare the greater part of labor to enhance recognized productivity. The utilization of programmed license plate acknowledgment system, precisely can achieve enhanced effectively that discover the stolen vehicles, likewise control significance street and tracking the questionable vehicles to diminish the infringement of traffic rules. Today's world increases steadily with number of the dangers. The assortment of them is likewise immense. It ranges from the pilferages to demonstrations of fear mongering. As a response numerous countermeasures are taken. In the majority of metro urban communities observation systems are introduced. They fundamentally diminish the number of demonstrations of vandalism, thefts, auto taking and so on. Then again numerous cameras in the city stay unused, because of the way that the procured picture must be controlled by the administrator. The police don't have enough staff to watch everything simultaneously. There is also another disadvantage of such systems. Storing the video stream from all cameras requires incredibly high capacities [2]. The solution of this problem might be replacing the human operator by an intelligent system that continuously analyzes the acquired image and detects some possibly dangerous situations. For this problem we are trying to design a robust system to monitor vehicles automatically. As far as the vehicle stealing problem is concerned, the surveillance system without mentioned disadvantages can be

developed. On the ground of above description, we claims that the system that only films the passing by vehicles can have very limited efficiency. It requires much time of many staff members to localize particular vehicle. Moreover it is almost impossible to monitor many suspected vehicles or detect them when present by the camera in real time.

### II. SOLUTIONS APPROACHES USED

After reviewing 28 research papers on Software Effort Estimation to explore and find out current challenges and scope for work, the following issues are find out.

Issue 1 : Issues related to Text Recognition

Issue 2 : Issues related to Number Plate Extraction

Issue 3 : Issues related to Image Segmentation

The discussion of various solution approaches under specific issues has been presented below.

#### 1. Solution Approaches to the issue "Text Recognition".

In an approach there proposed an off-line recognition system [1] for either machine printed or handwritten historical documents. The system comprises of a pre-processing stage where documents are changed over into binary images, a top-down division technique that concentrates the characters, the making of a database by the removed characters and an acknowledgment stage where the database is used for changing over any record into content document. The principle favorable position of this methodology is the way that neither any learning of the textual styles ahead of time nor the presence of a standard database is required. So it can be connected to various sorts of documents and even manage characters or ligatures that don't show up frequently. Another approach proposed OCR calculation consolidates the word division, character division and acknowledgment ventures in a rational template prepare step. The proposed AOOCR calculation [2] takes after the accompanying three primary strides , Image Acquisition ,Image pre-processing, Image acknowledgment. In the step Image acquisition, the proposed AOOCR starts with image acquisition process that scans the Arabic text using a 300 dpi scanner, the scanned image is saved in a .bmp image file. In the next step i.e., Image pre-processing ,the image is filtered using a median filter that removes noise, the image is converted from RGB to gray scale image, and then it is converted to binary image. And in the final step , i.e. , image recognition ,the binary image is segmented into lines of text. Another approach [4] presents a brief overview of digital image processing techniques such as Feature Extraction, Image Restoration and Image Enhancement. Handwritten character recognition is always a frontier area of research in the field of pattern

recognition. There is a large demand for OCR on transcribed documents in Image processing. Despite the fact that, adequate reviews have performed in outside scripts like Arabic, Chinese and Japanese, only a not very many work can be followed for manually written character acknowledgment chiefly for the south Indian scripts. OCR system improvement for Indian script has numerous application zones like preserving original copies and old literary works written in various Indian scripts and making advanced libraries for the documents. Highlight extraction and grouping are basic strides of character acknowledgment prepare influencing the general precision of the acknowledgment system.

## *2. Solution Approaches to the issue "Number Plate Extraction".*

In an approach there proposed a methods for vehicle license plate distinguishing proof is actualized and broke down, on the premise of a novel versatile picture division technique conjunction with character recognition[9]. A novel strategy for license plate restriction in light of surface and edge data is proposed. The entire procedure is isolated into two sections: applicant extraction and hopeful check. In the initial segment, the license plate being extricated from complex condition, a few hopeful ranges rather than one with the maximum surface data are separated. In the second part, autocorrelation based binary picture and projection calculation are used to confirm the plate hopefuls. Versatile middle channel is connected to expel the clamor from the picture. Picture processing technique, for example, edge discovery, thresholding, resampling and separating have been used to find and disengage the license plate and the characters.

In another approach a two-stage approach for confinement [10] is presented. In the initial step, the elements of characters are used to locate the likely characters areas. In the second step, the components of number plates are used to locate the likely number plate areas. This approach empowers the limitation of number plates in broadly fluctuating enlightenment conditions with pertinence to the commonly discovered sorts of Indian number plates with a win rate of 87%. In request to recognize the license number, the number plate region must be initially situated in the picture. The objective of restriction is to kill all the foundation and preserve only the number plate zone from the information picture. From this number plate zone, the individual characters are then portioned out and recognized. In the event that situations where the number plate script is non-English or the number plate is seriously mutilated are barred then, 87% of the plates were restricted accurately. Another approach has proposed an adaptable strategy for perceiving four-digit numbers on a license-plate [11] in a video scene. The technique comprised of three sections; worldwide look for finding a license plate in a scene, corner location for evacuating shape twisting, and numeral character acknowledgment. The spatial elements and the phantom (shading) ones were blended and prepared at once in the worldwide hunt. The Hough change was embraced for choosing sides of the license-plate among different edges in the accompanying corner identification. The corner focuses

found as cross purposes of the neighboring sides were used for expelling the shape twisting. The four-digit numbers were recognized by utilizing a virtual pixel algorithm with centroid pay. The worldwide inquiry accomplished 97 % of right identification rate for 100 arrangements of scenes. The corner discovery accomplished 65 % (39 of 65 scenes) of right recognition rate, up until now. The four-digit numbers on the license-plates, whose corners were accurately distinguished, were recognized consummately.

Another approach proposes a quick vertical edge location algorithm (VEDA) [12] in view of the complexity between the grayscale values, which improves the speed of the CLPD strategy. Subsequent to binarizing the information picture utilizing versatile thresholding (AT), an undesirable line disposal algorithm (ULEA) is proposed to upgrade the picture, and afterward, the VEDA is connected. The second commitment is that our proposed CLPD technique forms low-determination images taken by a web camera. After the vertical edges have been identified by the VEDA, the coveted plate points of interest in view of shading data are highlighted. At that point, the hopeful district in view of measurable and logical operations will be removed. At long last, a LP is identified. The third commitment is that we contrast the VEDA with the Sobel administrator as far as exactness, algorithm multifaceted nature, and processing time. The outcomes indicate precise edge identification performance and quicker processing than Sobel by five to nine circumstances.

## *3. Solution Approaches to the issue "Estimation Effort using Fuzzy Logic".*

In one approach the creator inspected diverse techniques of picture division. Division [25] is only making the piece of picture or any protest. Design acknowledgment and picture investigation are the underlying strides of picture division. In the PC vision area and picture examination we can done vital research subject in the division of video with element foundation. Picture division is the vast majority of judging or investigating capacity in picture processing and examination. Picture division alludes to parcel of a picture into various locales that are homogenous or comparable and in homogenous in a few qualities. Picture division comes about affect picture examination and it taking after higher request errands. Picture examination incorporates protest depiction and representation, highlight estimation. Higher request errand takes after characterization of protest. Thus portrayal, perception of district of enthusiasm for any picture, outline assumes an imperative part in picture division. Utilizing the distinctive algorithms the present systems of picture division is evaluated so that client association is feasible for images.

Another approach proposed another picture division algorithms in view of data bottleneck method[26]. They used three algorithms; first they present the split-and-union algorithm, where a picture is fragmented into set of areas (information) and the power histogram containers (yield) is gotten. The second algorithm is the histogram grouping algorithm, where the info variable represents the histogram containers and the yield is given by the arrangement of locales. At long last, the enlistment based division for two

enrolled multimodal images. Picture enrollment is the way toward overlaying images (at least two) of a similar scene taken at various circumstances, from various perspectives, or potentially by various sensors. The enrollment geometrically adjusts two images (the reference and detected images) represent a picture by a quad-tree representation, the picture is initially separated into 4 quadrants of equivalent size. At that point, every quadrant will be further sub-isolated on the off chance that it has more than one shading. The procedure proceeds until every quadrant or sub quadrant (conceivably a solitary pixel) contains only one shading.

III. DATA AND RESULTS

This section includes the comparative analysis of the solution approaches based on the variable and parameters used by the researchers in their proposed solution and the results which they have obtained, along with variations in the results.

The issue-wise tables have been included, which describes the solution approach, its reference, input and output variables

used, and the result of the solution approach.

1. Results obtained in the issue "Text Recognition".

S.No.	Solution Approach & References	Input /Parameter Used	Results
1	Off-line recognition system for machine printed and handwritten historical documents [1]	Domain : Machine printed or handwritten historical documents Database : 10 printed documents TrainSet1 and another set of 10 handwritten documents	Result are in database (TWDB) , Recognition rate is 95.44% achieved. type writer database (TWDB) , the text set has 1351 characters and the train set 5407 characters and system recognition rate was 94.62%.
2	Arabic OCR algorithm [2]	Domain : Arabic text recognition Tested on : Articles from Alrai news paper on 20/11/2011 and 30/11/2012, and Alrai news paper on Oct, 20, 2012	Recognition accuracy was 96.5%

3	Automatic extraction Methods of container Identity Numbers and registration Plates [8]	Domain : Numbers for car number plates Expreiments are been applied on 250 images ( 130 containers and 120 registered plates of cars ). 229 have been correctly segmented but 26	Recognition accuracy is 93%
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2. Results obtained in the issue "Number Plate Extraction".

S.No.	Solution Approach & References	Input /Parameter Used	Results
1	Feature Based adaptive image segmentation technique [9]	Domain : License Plate-Recognition of Indian Number Plates Database : The 10 training set of number plates has taken	85% for number plate localization, 95% for character segmentation and 82% for character recognition.
2	Two-step approach for localization [10]	Domain : License Plate-Recognition of Indian Number Plates Tested on : 20 dataset of number plates	87% of the plates were localized correctly
3	RELIP approach for Recognizing Four-Digit Numbers on A License-Plate	Domain: Monitoring Moving Car Movements. Dataset : 100 sets of scenes	97 % of correct detection rate for 100 sets of scenes

3. Results obtained in the issue "Image Segmentation".

S.No.	Solution Approach & References	Input /Parameter Used	Results
1	Sequential probability ratio test (SPRT) and the minimal cost criterion [27]	Domain : Real Life Image Segmentation Tested on : 20 dataset of number plates	0.88% on average indicates an irrelevance of the randomness of SPRT

### Strengths

After reviewing 29 research papers, following strengths have been found in various solution approaches:-

- VEDA Experiment results showed accurate edge detection performance and faster processing than Sobel by five to nine times.
- VEDA used Hough transform and horizontal projection profile both of which had efficient and fast hardware implementations, to not only extract the number plate but also simultaneously segment out the characters.
- In OCR software much higher recognition accuracy is obtained by gradually removing the license plate boundaries.
- A very high recognition rate of license plates can be achieved when the character of license plates are properly segmented using the Blob detection algorithm.

Morphology technique was Good for low illumination, Good for multiple backgrounds, Works for almost every weather.

### Weakness

After reviewing 29 research papers, following weaknesses have been found in various solution approaches:-

- Edge based techniques was very sensitive to same light intensity and noise.
- Histogram techniques was effective In varied weather.

Color feature based techniques highly dependent on proper localization of license plate.

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