ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020

OPTICAL CHARACTER RECOGNITION-BASED AUTOMATIC NUMBER PLATE RECOGNIZION SYSTEM

RAPALLI VENKATESWARLU, K HARSHAVARDHAN REDDY

Abstract—

The vehicle's license plate number can be read using a picture processing technique called automatic number plate recognition (ANPR). The goal is to create practical car number plate-based automated approved car recognition. This method is used to monitor and regulate access to prohibited areas, such as military bases or the vicinity of important government buildings like the House of Representatives or the Supreme Court. The newly created device can identify the car and then take a picture of it. Image segmentation is used to isolate the license plate area in a photograph. The characters are recognized using an optical character recognition method. Information like the vehicle's proprietor, registry location, address, etc. can then be gleaned from a database comparison of the resulting data. Mat lab is used for both development and simulation, and real-world images are used to evaluate the system's efficacy. Using real-world pictures, the created system is able to determine and identify the vehicle's license plate, as seen in the trial.

I. INTRODUCTION

Automatic Number Plate Readers (ANPRs) were developed in 1976 by the Police Research and Development Center. British branch of the company. However, its fame skyrocketed at the time. In the last decade, digital imaging has made tremendous strides. And the development of more powerful computers. Just the fact that we can now use a digital picture of a vehicle's license to decipher the plate's numbers and letters has revolutionized the industry. Consist of something, like a camera image or a screenshot, that to see the relevant Extracting Characteristics from an Image, look up the corresponding number in the collection. Using image and text recognition software that can pick out individual pixels. From monitoring speeds and storing supplies to coordinating car garages, parking spaces, and more, ANPR has a wide range of applications. It has dual diagnostic and preventative applications, making it ideal for use in high-stakes managerial settings such as nuclear power plant and military compound perimeters. In comparison to alternative ANPR devices [2] [5], its Setup is more affordable. The Hough transforms and border detection are used in conventional approaches, both of which are time-consuming and resource-intensive. Network wherein a lot of information is needed for training [2] [3] [4]. The proposed ANPR system utilizes the Sindh numbering system, is real-time, and requires little in the way of space or weight. Regular dish for most people. The first of the ANPR system's three stages is the identification and capture of a potential threat. A car's license plate and other identifying information must be scanned and extracted from the picture after it has been captured. At last, we implement picture partitioning for face identification. OCR (Optical Character Recognition) uses a library of information about each individual dot and character to uniquely identify a letter in each instance. The remaining content reads as follows: will present virtual and physical prototypes of a commercially available ANPR device. Section 3 will show proof of this. The updated ANPR. Technology has been tested, and the findings are presented below. The study's conclusions and recommendations are discussed in Section 5. Section 4 provides a concise overview of the findings.

Assistant professor1,2
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
P.B.R.VISVODAYA INSTITUTE OF TECHNOLOGY & SCIENCE
S.P.S.R NELLORE DIST, A.P , INDIA , KAVALI-524201

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020

II. SYSTEM MODEL

The complete ANPR device can be broken down into its software and hardware components. Both approaches will be discussed in depth in this part.

A. Software Model

The program paradigm is the backbone of this entire setup. The program model employs a battery of picture processing methods enacted in 7-0-1 MATLAB. There are three main components to the ANPR algorithm: Images must be captured, the plate must be removed, and the numerals on the plate must be recognized. The first thing to do is take a picture with the USB camera attached to the computer. In order to facilitate subsequent processing for number plate extraction, the pictures are recorded in RGB format. Number plate retrieval is the next process in the ANPR program. The most likely ROI in a picture is extracted using a yellow search method. Searching for yellow pixels is a quick and simple way to locate the plate region, as the official Sindh number plate has a yellow backdrop with numerical characters printed in black. Pixels in the picture with a number closest to yellow are sought out. A pixel is given a value of 1 if and only if it is yellow and a value of 0 otherwise. The final picture acquired from the search method is monochrome. Once the ROI has been located, two distinct filtration methods are applied to the picture. The first method entails setting the pixel value to 0 in all white areas that are adjacent to a boundary. The secondary In order to screen out irrelevant parts of the picture that aren't the plate, the pixel count approach is used. Areas with a number of white pixels less than a cutoff are set to 0 after being examined for continuity. Only the license plate of the car is visible at this time. The next step in number plate extraction is a smearing method [x]. The blurring method looks for the top left and bottom right white pixels in a picture. The picture is then trimmed down to just the license plate.

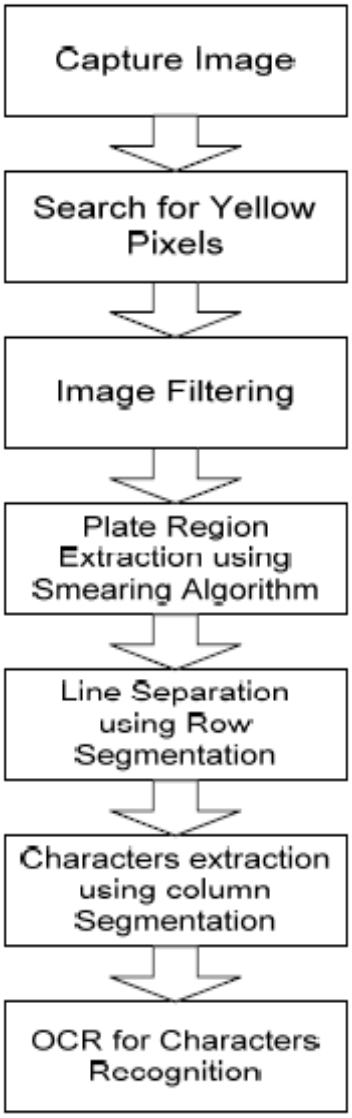
The created ANRP algorithm then moves on to stage three, where an Optical Character Recognition (OCR) method is used to decipher the car identification number. The second-step reduced picture is reversed, meaning all white pixels are changed to black and all black pixels are changed to white. The plate's backdrop is now dark, while the writing is white. The line separation procedure is used to divide the lines of text before OCR is applied.

Each array of pixels' values are added together to form the line spacing. If the total of a row comes out to zero, then that row does not contain any text pixels. Row contains the content if its total aggregate is larger than zero. The beginning of the line is the first resultant sum that is larger than zero, and the conclusion of the line is the first resultant sum that is equivalent to zero. The first line of text is cut off based on its beginning and ending numbers. The same method is used to break up the second section of text.

B. Hardware Model

The hardware configuration includes a camera, motor, and motor driver circuit for barrier management, and sensors for detecting car present. Entryway, personal computer (PC) running ANPR algorithm, and microprocessor managing all ANPR hardware components. The infrared sensor detects a car as it pulls into and parks within the sensor's field of view, sending a signal to the computer via the microprocessor 89C51. A photograph of a car is taken by a camera that is linked to a computer via a USB connection. After the picture is received and processed by the ANPR program on a personal computer, the car identification number is displayed. After checking this value against the approved one, a signal is sent to the system's microprocessor, allowing it to operate the necessary hardware. The motorized, green gate at the front entryway will rise if the entered license plate includes the correct authorization number. If the inputted plate contains an approved number, the barrier will be lifted and the green indication light will turn on, while if the inputted plate contains an illegal number, the barrier will remain down and the red indication light will turn on. Figure 2 displays the full hardware architecture diagram.

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020



Model of Automatic License Plate Recognizer Steps

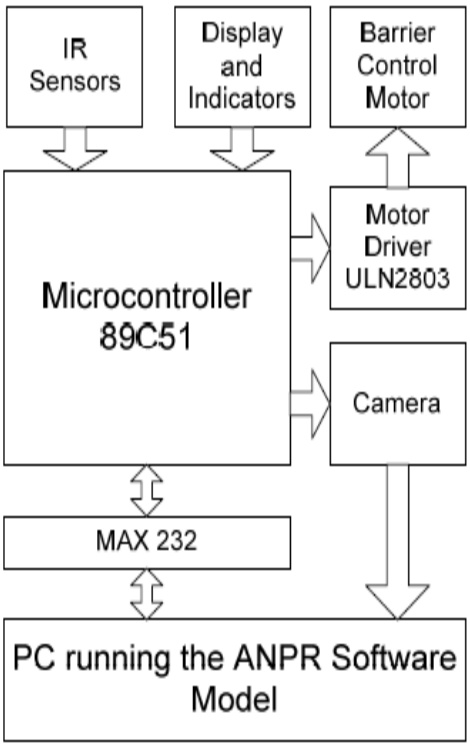


Figure 2 Hardware setup of ANPR system

III. SIMULATION RESULTS

Here, we show off the created ANPR system's test findings. In the first step, a Matlab link is built between the camera and the PC. A USB cable connects the camera to the computer. Images of vehicles of various hues and designs are captured and saved on a computer. During this procedure, the varying impacts of natural light are also taken into account. Figure 3 depicts an example of a picture showing the RGB color space and the 800 by 600 pixel size. After the picture was taken, the yellow search technique was used to find relevant results. The results of running the yellow search algorithm are displayed in Figure 4. Yellow, or a near relative of yellow, is represented by the whitish area. The ROIs that only contain license plates were effectively identified by the yellow search method. Next, we employ the blurring method depicted in Figure 5 to extricate the license plate from the image. The number plate of the car is read and then encoded into codes. The binary and reversed binary formats are depicted in Figures 6 and 7, respectively. The next step is to separate each letter from the car number plate using row and column segmentations. Row and column separation yields the following results: as depicted in Figure 8 and Figure 9. As can be

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020

seen in Figure 10, when OCR is used for character identification, every single alphabetic and number symbol is identified.

IV. DISCUSSION

A car's existence at the entryway triggers the device to begin functioning. Microcontroller transmits

Figure 3 Images taken using USB camera

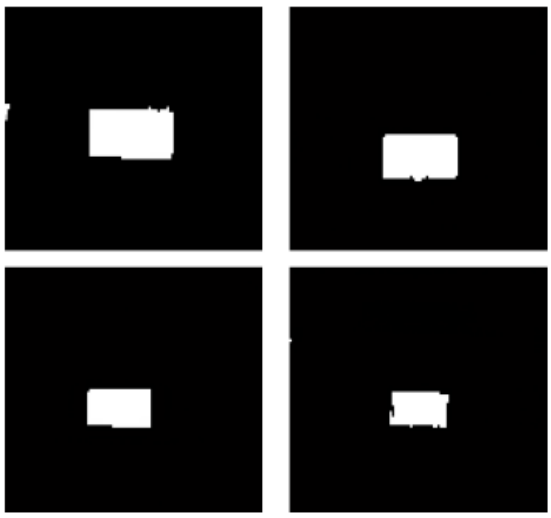


Figure 4: The Yellow Search Algorithm for Region-of-Interest Detection

Figure 5 Extraction of license plates from vehicles using a blurring algorithm.

Figure 6 Binary image

Figure 7 Inverted binary images

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020

Figure 8: Line Disambiguation via Segmenting Rows

Figure 9: Column division for character differentiation.

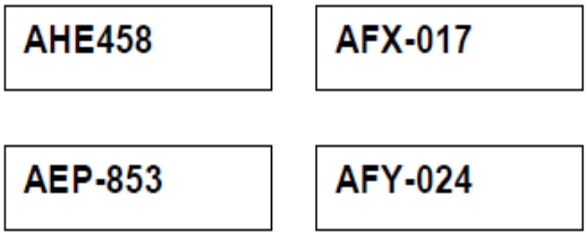


Fig. 10 Send signal to computer for character recognition using optical character recognition software; capture picture with USB camera connected to computer. A computer initiates the ANPR process. Also indicates the permission to operate the car. A big number of 800x600px pictures are used to evaluate the ANPR algorithm. The created ANPR program identifies Sindh standard car number plates effectively in a variety of daylight circumstances, demonstrating a high detection and identification rate. It has the ability to read license plates from a distance. The spacing can be used to estimate the size of the license plate in a picture. The optical character recognition (OCR) method is then used to read the letters from the vehicle's number plate. The OCR employs a correlation-based approach to character identification and additionally allows for the calculation of a recognition chance. The method can be applied for real-time car recognition and requires little in the way of processing resources to do so.

CONCLUSION AND FUTURE WORK

In this article, we show an AVID system that works solely off of car registration plates. For object recognition, the device employs a battery of picture analysis automobile by pulling it up in the computer's inventory. Matlab is used for the implementation, and the system's efficacy is evaluated using real-world pictures. The test findings demonstrate that the system can be used to locate and identify vehicles by license plate in a variety of lighting conditions, making it suitable for use at the gated entryway of secure facilities. The execution is effective, though it could be better. The lengthy exposure time of the camera used in this endeavor makes it susceptible to shaking and rapidly moving objects. Using a high-resolution sensor improves the system's quickness and reliability. Due to the fact that the OCR techniques employed in this project are size- and orientation-sensitive, affine modification can be used to enhance OCR detection under varying conditions. Detection and identification probabilities for car number plates can also be defined using statistical analysis.

REFERENCES

[1] Optasia Systems Pte Ltd, "The World Leader in License Plate Recognition Technology" Sourced from: www.singaporegateway.com/optasia, Accessed 22 November 2008.

[2] J. W. Hsieh, S. H. Yu, and Y. S. Chen. Morphology based license plate detection from complex scenes. 16th International Conference on Pattern Recognition (ICPR'02), pp. 79–179, 2002.

[3] V. Kasmat, and S. Ganesan, "An efficient implementation of the Hough transform for detecting vehicle license plates using DSP's," IEEE International Conference on Real-Time Technology and Application Symposium, Chicago, USA, pp. 58-59, 2005.

[4] S.H. Park, K.I. kim, K. Jung and H.J. Kim, "Locating car license plate using Neural Network," Electronic Letters, Vol. 35, No. 17, pp. 1474 – 1477, 1999.

[5] K.K. KIM, K.I., KIM, J.B. KIM, and H.J. KIM, "Learning-Based Apporach for License Plate Recognition" Proceeding of IEEE Signal Processing Society Workshop, Vol. 2, pp.614-623, 2000.

ISSN2321-2152www.ijmece .com
Vol 8, Issue.3, Sep 2020