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Digital Signature Based Theft Vehicle Detection Using Image Processing

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ABSTRACT: Automatic License Number Plate Recognition is a computer system which recognizes any image which is digital automatically on the number plate. This system undergoes various operations like capturing images ,localizing number plate trunacating characters and OCR from alphanumeric characters. The main idea of this system is to design and develop effective image processing techniques to localize number plate in captured image, to divide characters using the Open CV Library. This has been implemented in python programming language. There are various applications such as security, identification of stolen vehicles, automatic fee collection systems.

KEYWORDS: Python, Open CV, identifying the vehicle, number plate detection, optical character recognition

I. INTRODUCTION

- Vehicle theft detection is becoming as an increasingly important challenge in many urban areas. Some of the factors that affect the detection of such thievery are: a change in the original vehicle number plate, dismantling and. mismatching the parts of the vehicle alteration in the original vehicle colour. These complications have led to serious difficulties in identifying the theft vehicles. In order to reduce the effort required in tracking the stolen vehicles, this research work has developed a system that can efficiently detect the theft vehicle irrespective of its altered vehicle number plate and colour. The proposed vehicle theft detection process is done with the help of microcontrollers and some modules. Automatic number-plate recognition can be used to store the images captured by the cameras as well as the text of license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take picture.Because of the increase in the number of vehicles every day, the Recognition of License Plate (RLP) plays a vital position in this bustling environment. Identification of a license plate, identification of characters and recognizing each and every character; are some of the fundamental process steps. Among them, segmentation is a crucial part, since the precision of recognition is dependent on how accurate the segmentation is.

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Fig1. Vehicles

1.   Modern vehicles are not just a combination of engine, chassis, body, and wheels. They are equipped with many sensors and electronic devices to assist drivers. The vehicle industry is expanding exponentially and more features are being added to vehicles for safe driving. Most of these features are integrated as an Automatic number-plate recognition (ANPR; see alsoother names below) is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data. It can use existing closed-circuit television, road-rule enforcement cameras, or cameras specifically designed for the task. ANPR is used by police forces around the world for law enforcement purposes, including to check if a vehicle is registered or licensed. It is also used for electronic toll collection on pay-per-use roads and as a method of cataloguing the movements of traffic, for example by highways agencies. Automatic number-plate recognition can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of day or night. ANPR technology must take into account plate variations from place to place. Privacy issues have caused concerns about ANPR, such as government tracking citizens' movements, misidentification, high error rates, and increased government spending. Traffic control and vehicle owner identification has become major problem in every country. Sometimes it becomes difficult to identify vehicle owner who violates traffic rules and drives too fast. Therefore, it is not possible to catch and punish those kinds of people because the traffic personal might not be able to retrieve vehicle number from the moving vehicle because of the speed of the vehicle. Therefore, there is a need to develop Automatic Number Plate Recognition (ANPR) system as a one of the solutions to this problem. There are numerous ANPR systems available today. are based on different methodologies but still it is really challenging task as some of the factors like high speed of vehicle, non-uniform vehicle number plate, language of vehicle number and different lighting conditions can affect a lot in the overall recognition rate. Most of the systems work under these limitations. In this paper, different approaches of ANPR are discussed by considering image size, success rate and processing time as parameters. Towards the end of this paper, an extension to ANPR is suggested.

II. RELATED WORK

Creation and Implementation of number plate detection system for security purpose. The database possess data of vehicles and number plate identification files.

[1].Vehicle's License Plate: This paper presents the idea of character recognition of the vehicle around the plate under different illuminations using Grayscale conversion and matching them with database. This can be used for stolen vehicle identification.

[2]Another method is to display in which character areas are selected through binarization, connected component analysis. This unit can achieve more accuracy rate in character segmentation. The reliability of recognition was 90%.

[3] Provides an overview of the analysis of related components and processes, such as aspect ratio analysis and pixel count analysis.

[4] The author studies a comparison of four algorithms that are sequentially using statistical properties, the Hough Transform and Contour algorithm, the medium transformation approach and morphological processes and their results.
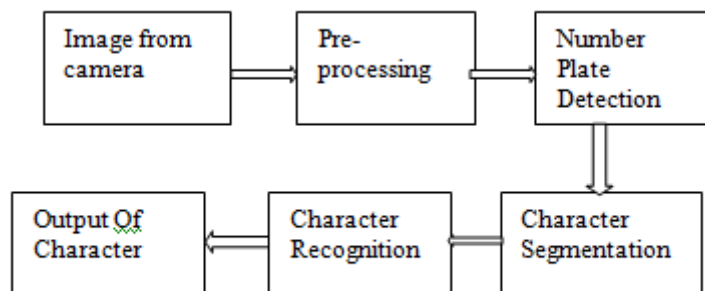
III.PROPOSED WORK

Fig 2: Block Diagram of Licence Plate

1.Capture the Input image:
The car's number pad is taken from a high resolution camera. The resolution of the number plate recognition system depends on the captured image. The image captured in RGB format must be converted to a gray image.

.2 Pre-processing
Pre-processing is a set of algorithms applied to the image to improve the quality by which the gray image is converted to a binary image. Before converting to a binary image, the image is smoothed to reduce noise. Pre-processing can be done by the threshold algorithm. There is a different kind of threshold like
∟ Global threshold
∟ Adaptive mean threshold
∟ Adaptive Gaussian threshold

Global threshold: The threshold is a nonlinear process where two levels are assigned to pixels lower or bigger than the threshold value specified. The threshold value is constant. The grayscale picture is converted to convert the binary image according to the formula
Dst (x, y)= {max value if src(x,y)>T(x,y)
0 otherwise

Where T (x, y) is the threshold calculated individually for each pixel. Average adaptive threshold: The value of the threshold is the average area of the neighborhood. Gaussian Adaptive Threshold: Threshold value is the sum of the values of the values of the neighborhood where the weights are a Gaussian window. The gray picture is then converted to a binary picture by the adaptive threshold method. The threshold is the simplest way to divide objects fromthe background. If the background is relatively same, the global threshold can be used. For large change in background intensity the adaptive threshold is used.

3 Number Plate Recognition

The license plate is extracted using either a shape analysis or a color analysis method. In the General License Panel has in form of a rectangular shape. Thus, algorithms look for geometrical shapes of a rectangular proportion. In India, most license plates are white or yellow, and therefore can also use color analysis. Before you find the rectangle in an image, the image must be in a binary image or the edges of the image should be detected. Then you should find and connect to the relevant rectangular corners. Finally, the areas connected to the box are connected and all rectangular areas of interest are extracted.

Fig 3.Number Plate Recognition

4 Character Segmentation
Once the license plate has been extracted, each character must be fragmented. For component division, the component label is used to see the computer in order to discover the connected areas in binary digital images. The label of connected components works by scanning a pixel-in-pixel image from top to down to find connected pixels.
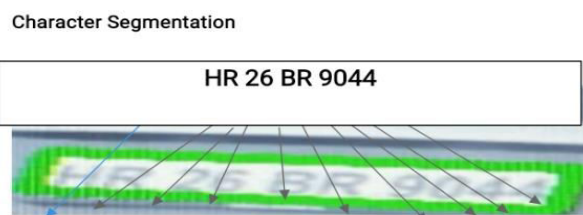

Fig 4.Character Segmentation

IV. EXPERIMENTAL RESULTS

For whole working of this project 12V power supply will be required.

The grayscale picture is converted to binary image according to the formula. Dst (x, y)= {max value if src(x,y)>T(x,y Firstly a grayscale filter is applied in the image as illustrated. After that, a bilateral filter is applied to remove noises on the image as . So, the noises could be removed without damaging the edges of the frame, and the edges are detected as shown . A loop starts to find the rectangle that has the plate .

Python | Gray scaling of Images using OpenCV
Gray scaling is the process of converting an image from other colour spaces e.g RGB, CMYK, HSV, etc. to shades of gray. It varies between complete black and complete white.

Importance of gray scaling –
Dimension reduction: For e.g. In RGB images there are three colour channels and has three dimensions while gray scaled images are single dimensional. Reduces model complexity: Consider training neural article on RGB images of 10x10x3 pixel. The input layer will have 300 input nodes. On the other hand, the same neural network will need only 100 input node for gray scaled images.

For other algorithms to work: There are many algorithms that are customized to work only on gray scaled images e.g. Canny edge detection function pre-implemented in OpenCV library works on Gray scaled images only.

We got the results as show in below fig.a & b. By using Python Open CV and image processing(I.e.RGB to gray scale conversion) we can detect fraudulent vehicle. The license plate is extracted using either a shape analysis or a colour analysis method. In the General License Panel has in form of a rectangular shape. Thus, algorithms look for geometrical shapes of a rectangular proportion. In India, most license plates are white or yellow, and therefore can also use colour analysis. Before you find the rectangle in an image, the image must be in a binary image or the edges of the image should be detected. Then you should find and connect to the relevant rectangular corners. Finally, the areas connected to the box are connected and all rectangular areas of interest are extracted
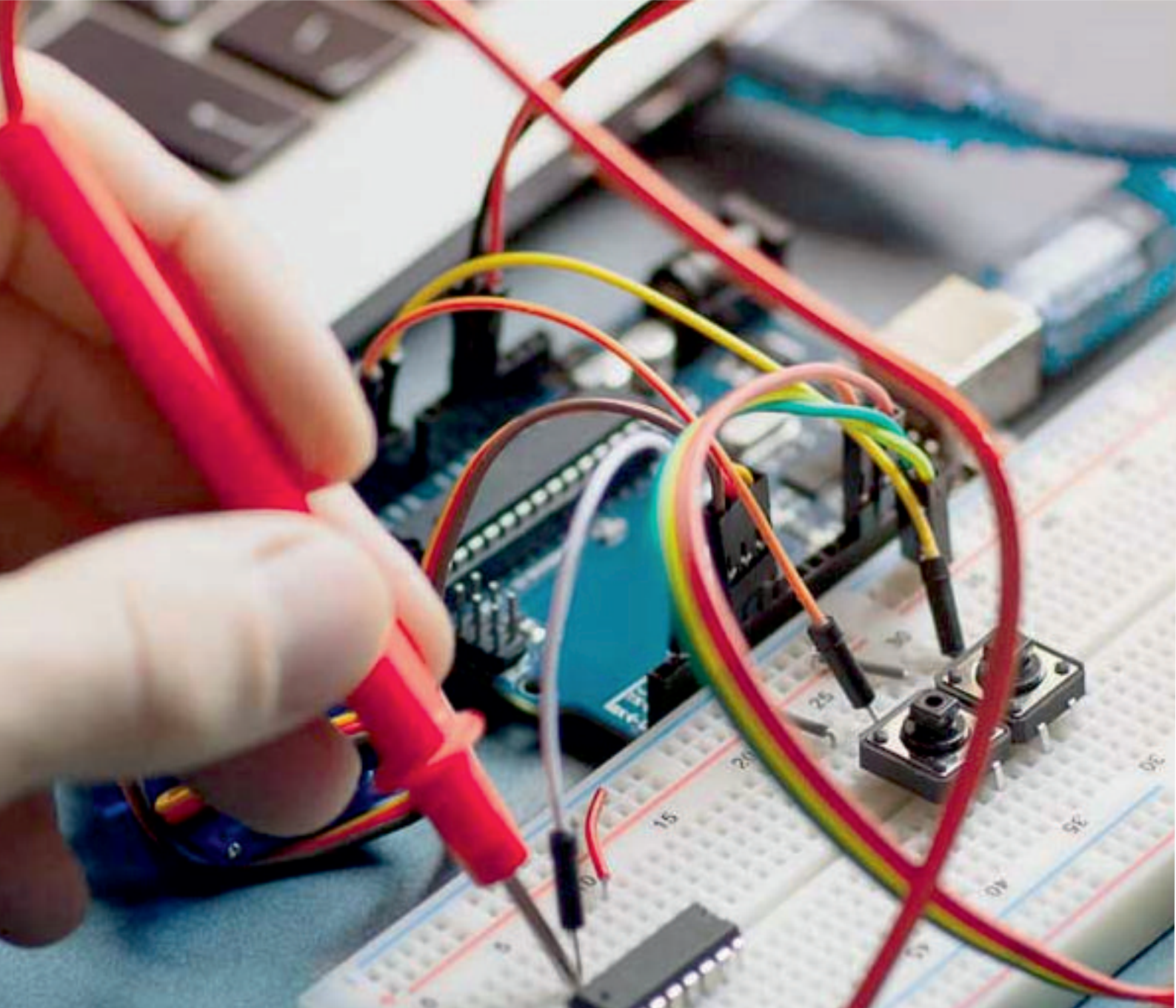
V.CONCLUSION

Scanning number plate sometimes goes unsuccessful by using the shape analysis method to detect exact area of the plate. Future extension of this work is to develop character recognition using template matching algorithm. Detecting number plate characters during night times work efficient but it gets inefficient in case of sunny time. It is concluded that the system can be useful for the police department to detect fraudlent car. They can just upload theft vehicle number for more refined search. The main idea is keep this more simple and cost effective without compramising on the reliability

REFERENCES

1.Proceedings of the Third International Conference on Smart Systems and Inventive Technology (ICSSIT 2020)IEEE Xplore Part Number: CFP20P17-ART; ISBN: 978-1-7281-5821-1
2.International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 03 | Mar 2019 www.irjet.net p-ISSN: 2395-0072
3.Weiping Chang and ChingweiSu, " Design and Deployment of a National Detecting Stolen Vehicles Network System", Intelligence and Security Informatics-PAISI, 2010.
4. Rami Al-Hmouz and Subhash Challa, " Intelligent Stolen Vehicle Detection using Video Sensing", Information
Decision and Control-2007, 2007.
5.Chirag Indravadanbhai Patel, D. Shah and Atul Patel, " Automatic Number Plate Recognition System (ANPR): A Survey", International Journal of Computer Applications-2013, 2013.
6.P. Meghana, S. SagarImambi, P. Sivateja and K. Sairam, "Image Recognition for Automatic Number Plate

Surveillance & quot;, International Journal of Innovative Technology and Exploring Engineering(IJITEE-2019), 2019.

7.Abhishek Kashyap, B Suresh, Anukul Patil, Saksham Sharma and Ankit Jaiswal, "Automatic Number Plate Recognition & quot;, International Conference on Advances in Computing Communication Control and Networking (ICACCCN-2019), 2019.

8.Prathamesh Kulkarni, Ashish Khatri, Prateek Banga and Kushal Shah, & quot;Automatic Number Plate Recognition (ANPR) System for Indian conditions & quot;, 19th International Conference Radioelektronika-2009, 2009.

9.M. T. Qadri, Muhammad Asif. (2009). " Automatic Number Plate Recognition System for Vehicle Identification using Optical Character Recognition" . Education Technology and Computer, ICETC – 2009

10.Vengatesan, K. & Karuppuchamy, V & Shaktivel, Rakesh & Singhal, Achintya.(2019). Face Recognition of Identical Twins Based On Support Vector Machine Classifier577-580. 10.1109/ISMAC47947.2019.9032548

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