LICENSE PLATE RECOGNITION

CCAI322

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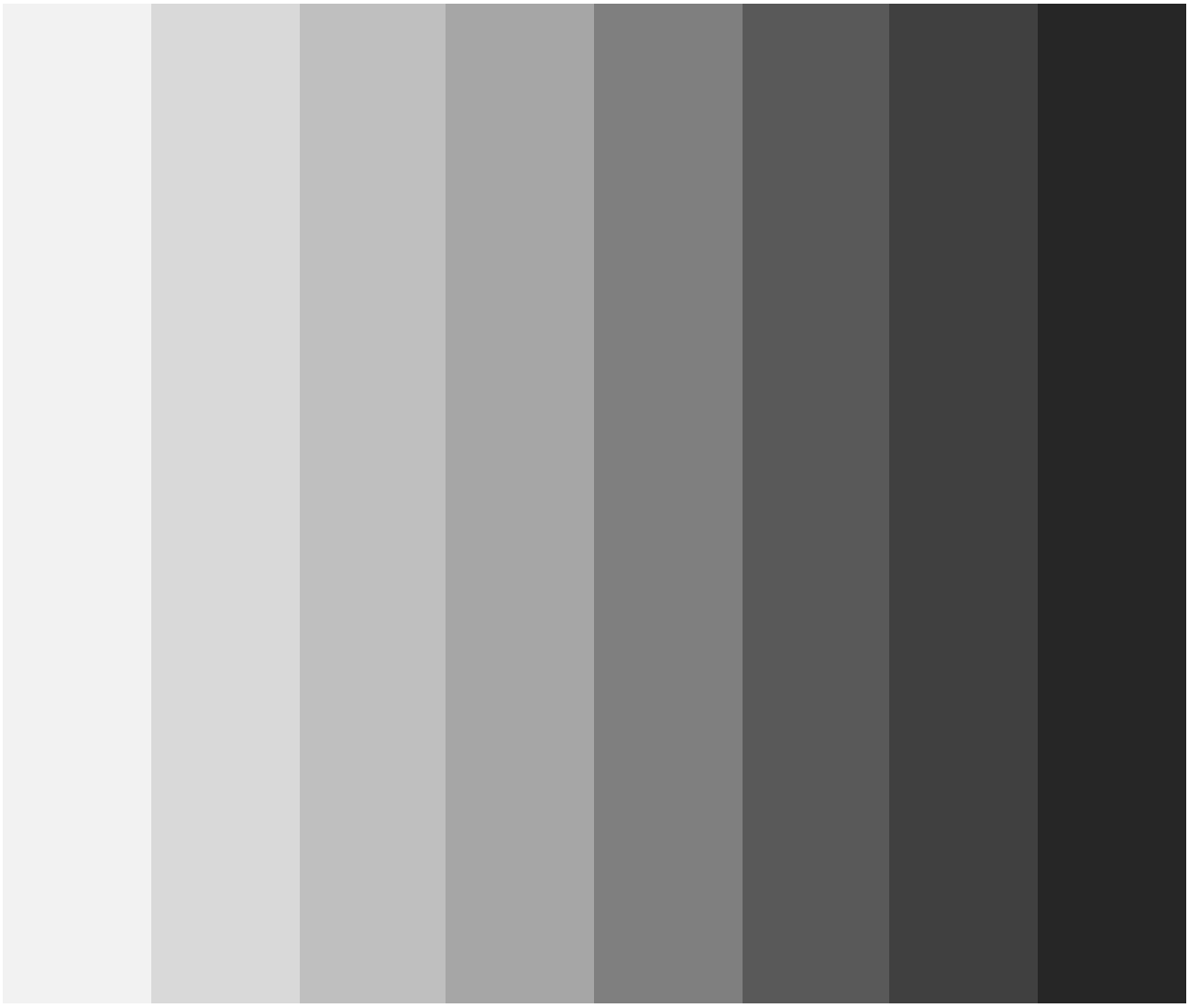


Table of contents

Introduction 3

Problem statement 3

Project goal 3

Project Identification 3

Methodology 4

Findings 4

Conclusion 6

References 6

Introduction

ANPR (Automatic Number Plate Recognition) is a system used to detect and recognize numbers on a vehicle's license plate. The idea behind it is as follows. Cameras in ANPR systems capture images of vehicle license plates. Several algorithms are used to convert the image into alpha numeric text format after it is processed through multiple algorithms. A wide range of places use the ANPR system, such as petrol pumps, shopping malls, airports, highways, toll booths, hotels, hospitals, parking lots, military checkpoints and defense sites.

Problem statement

This project is the gift given by digital image processing. Here we process the image for finding the useful information i.e. no plate code. In the real word, traffic is so much high that we cannot control and check all the vehicles passing by which violate traffic rules through high ways and roads. So, we need some advance system which can automatically record and check the passing vehicles and note down the number in digital form. So, it would help to maintain the perfect check on the vehicles passing by and the security would be easy and reliable.

Project goal

Because images taken by the camera would be of large size and storing thousands of images would waste a lot of time and memory space. So we need such a system which can reduce complexity. This project converts only license plate area (i.e. useful information) into the digital text format. which takes size merely in kb. So, we can store a lot of record in such small space and also it would be easy to match records of criminals using this digital information.

Project Identification

Using this project, we got to know how characters on the number plate can be detected using MATLAB. There are many people, who are violating traffic rules day by day. It is becoming quite difficult for traffic officers to catch and punish the violators. The vehicle's license plate recognition algorithm based on the very elementary technique of Templates matching. The algorithm takes an input image of the number plate (number plate should be dominant in the image) and after filtering the image, it performs region based operations. Then it tries to capture the characters regions in a processed binary image and with the aid of template matching outputs the string of number plate characters [1].

Methodology

By using MATLAB Image Processing, we were able to transform the license plate character to a text format. The figures shown in Figure 1 illustrate how the images were processed [2].

FIRST STEP: Developing a program that takes an image input from the user and processes it as follows:

- Converting the image from RGB to Grayscale.
- Converting from Grayscale to Binary scale.
- Detect the image edges.

Once the license plate is detected, the program will read the characters from the image and find the highest matching alphanumeric.

SECOND STEP: In order to match the alphanumeric images with the input image, we created another program that holds binary alphanumeric images and stores them in a new template as data files.

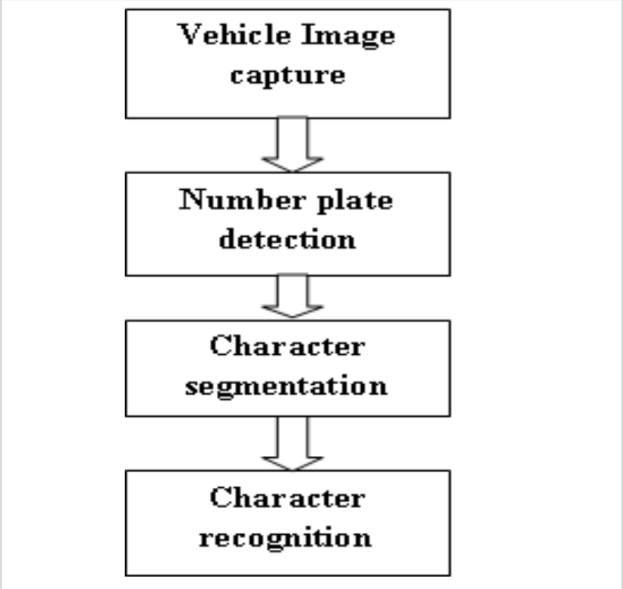


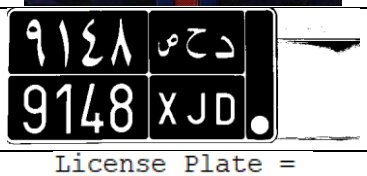
Figure 1 Conventional Automatic Number Plate Recognition (ANPR)

Findings

The program detected and processed the images but had some difficulty recognizing the characters on the license plates. This was due to the angles of the input images, the different languages on the plates, or the shape of the plates. An experiment of eleven images was as follows:

1	2	3	4
			
			
License_Plate = 'PZ65DYV'	License_Plate = 'CO4236AX'	License_Plate = '7VC41'	License_Plate = 'OBN366'
5	6	7	8
			
			
License_Plate = '21BH2345AA'	License_Plate = 'DJ69HED'	License_Plate = 'KAF54539'	License_Plate = 'Z84FH8'

All license plates were detected and recognized correctly except for numbers 7 and 8, which showed some errors in character recognition. Additionally, we tested the program with Arabic license plates and found the following:

9	10	10.*
		
		
License_Plate = '8A9A11B'	License_Plate = 'L91116S8A'	License_Plate = '9168'

It is evident from the first two images that it is unable to recognize Arabic license plates. The second image was manipulated by removing Arabic alphanumeric, which led to better recognition of characters in the third image.

Conclusion

The purpose of this process was to identify car owners who violate traffic rules by transferring images of their license plates into text. Our results showed that 72% of the transformations were correct, with the rest either being completely wrong or having smaller issues. Nonetheless, it will not be possible to achieve 100% overall accuracy since sometimes the acquisition of the image might contain numerous issues that require more processing and will be computationally effective. Therefore, improving the program is still possible. Some capabilities will include the ability to detect Arabic license plates correctly, as well as the ability to detect images from different angles.

References

[1] Kaur, S., & Kaur, S. (2014). An efficient approach for number plate extraction from vehicles image under image processing. *International Journal of Computer Science and Information Technologies, 5(3*), 2954-2959.

[2] Patel, C., Shah, D., & Patel, A. (2013). Automatic number plate recognition system (anpr): A survey. *International Journal of Computer Applications*, *69*(9).