# Car Number Plate Recognition System

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**Abstract:** *The objective is to design an efficient vehicle identification system using the vehicle number plate. The system is implemented for a Housing society or a private colony. The system first loads the image of vehicle registration plate. OCR technique is used for character recognition. The original image which is stored in the application folder will be compared with the loaded image. The system will then verify whether the image is original or fake if the image is authenticated the gate will open indicated by glowing green led else gate will remain closed and a message will be sent to the security personnel.*

**Keywords:** OCR, Character Segmentation,

## 1. Introduction

The aim is to develop an automatic license plate recognition system to recognize license plate of a car that can be used for traffic management purpose, Identification of stolen cars, Security control of restricted access areas, unattended parking lots etc.The input to the system is a digital image captured by a camera. With the images it acquires, the system will generate report or details of the car on a computer. Once the car number plate is captured it will be processed using image processing techniques. First it extracts the license plate number from an image it then performs character segmentation on the enhanced image and later finds each character from the image and converts it from image format to text format. After the license plate number is recognized a check is done to monitor if the number is authenticated or not. If the number is authenticated then the gate will be opened so that the car can enter or else if the car is not authenticated then the gate will remain closed and a message will go to the security personnel informing him that the car arrived at the gate is not an authenticated car..

## 2. Optical Character Recognition

1. Load an Image.
2. Resizing of an Image.
3. Inversion of a loaded image.

4. Sharpening of an Image.
 5. Conversion of a Sharpened image into Binary image.
6. Cropping Of Number Plate from an Image.
7. Character Recognition of an Image.

## 3. Image Comparison.

1. Take a image
2. Conversion of an image into Grayscale.
3. Dividing of Image into Blocks.
4. Calculate differences of a Loaded Image with stored image by Comparing Corresponding blocks of an image.
5. Block Comparison is done using Pixel to Pixel Comparison.
6. If the difference between the two images is greater than the threshold value then the image comparison algorithm will return as match fail.

## 4. Car Authentication

 Here the recognized string is matched with the registration number in the database then the name of the original image stored in the database corresponding to that entry will be retrieved and using this image name the original image will be obtained which has been saved in the original image folder. Then this original image will be compared with the currently processed image (fake image). If the match is more than or equal to the threshold value then the car will be seen as an authorized car and the gate will be opened. If the match result is less than the threshold value then the gate will remain close and a message will be sent to the security personnel.
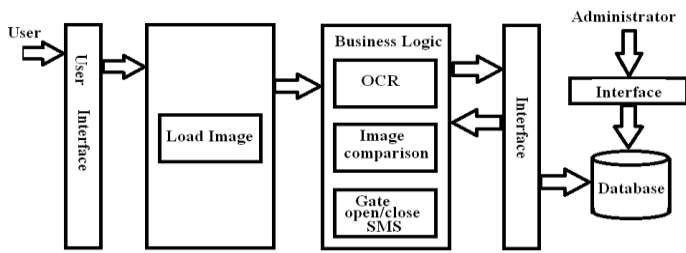
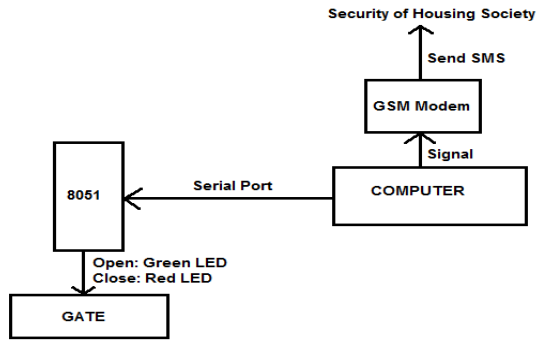## 5. System Architecture



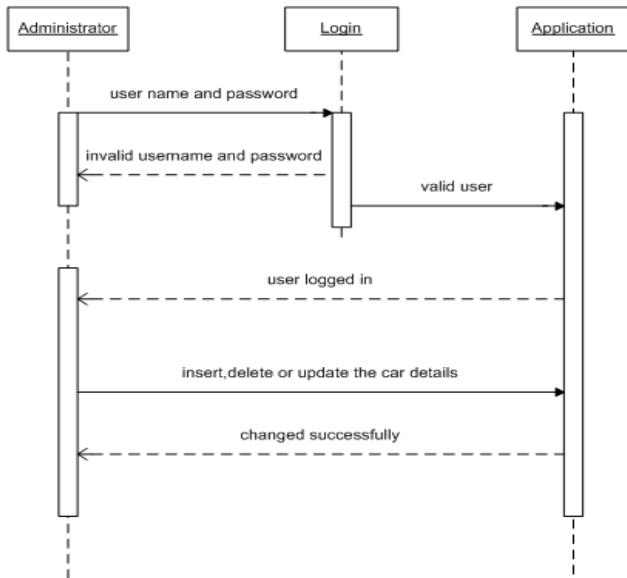**Figure 1:** System architecture



**Figure 2:** System interface



**Figure 3:** Sequence diagram for administrator
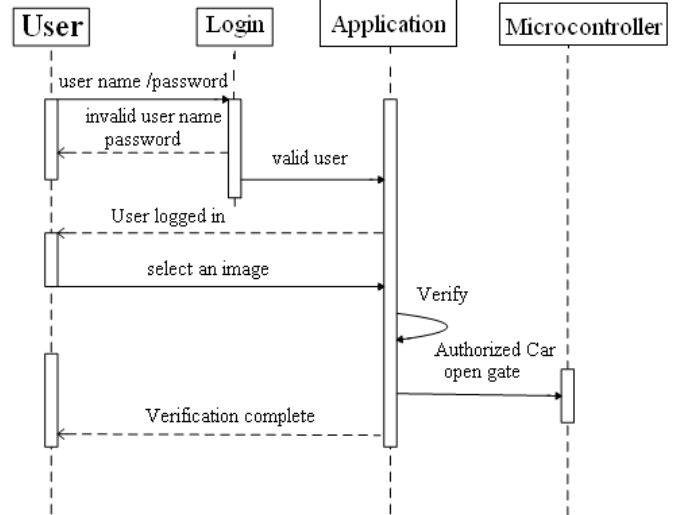


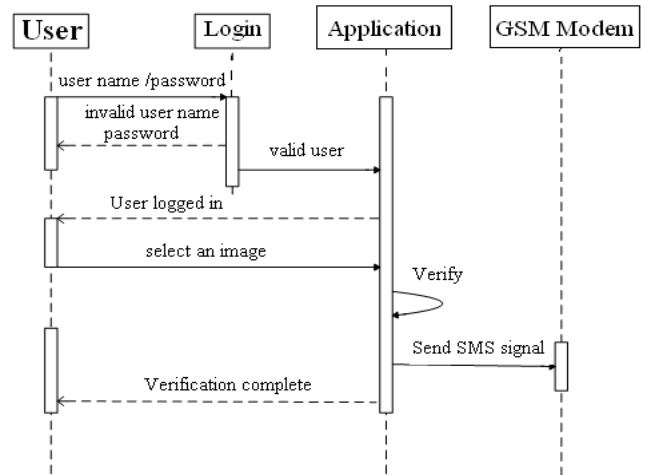**Figure 4:** Sequence diagram Authorized car



**Figure 5:** Sequence diagram unauthorized car

## 6. Results

Input:



Resolution 1024x756

Output :



Resolution 448 x 109

**Figure 6:** Resizing of image

Input :



Output:



**Figure 7:** Converting image to Grayscale image

Input :

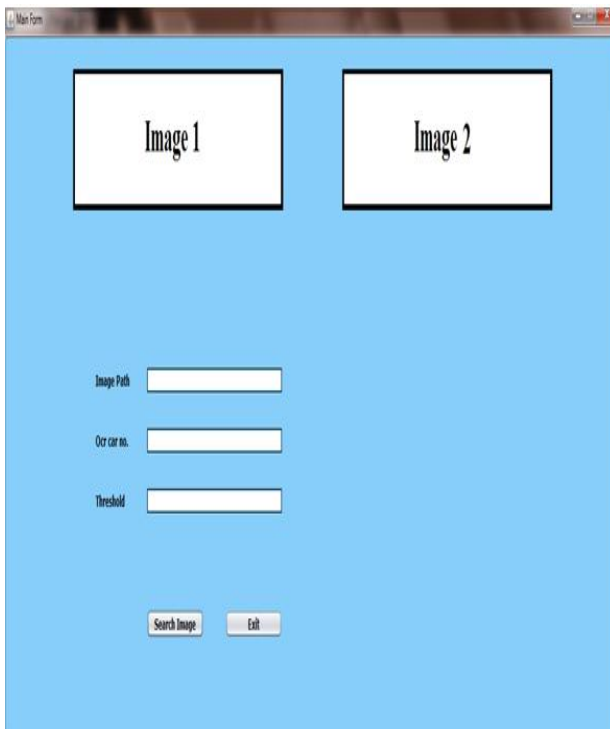

Output:



**Figure 8:** Converting image to Binary image
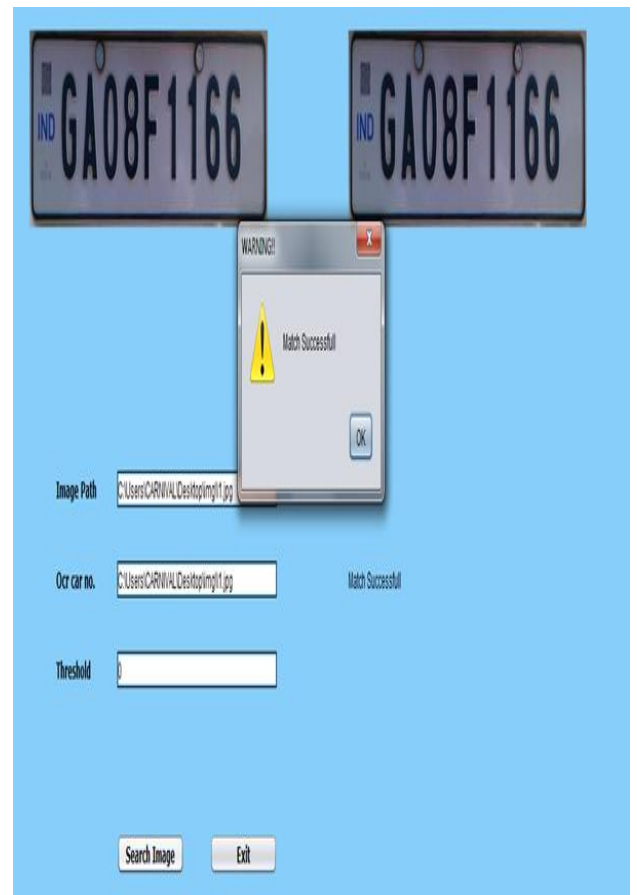


**Figure 9:** Image to image comparison



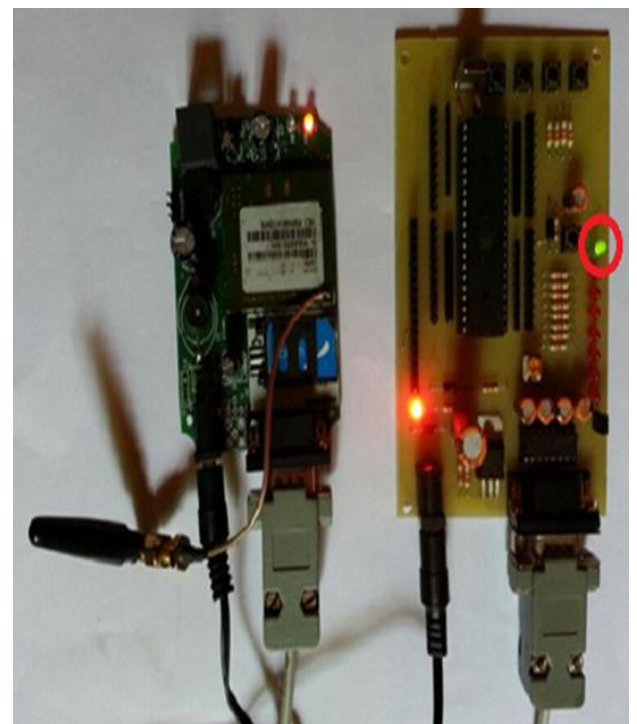**Figure 10:** Image comparison match successful



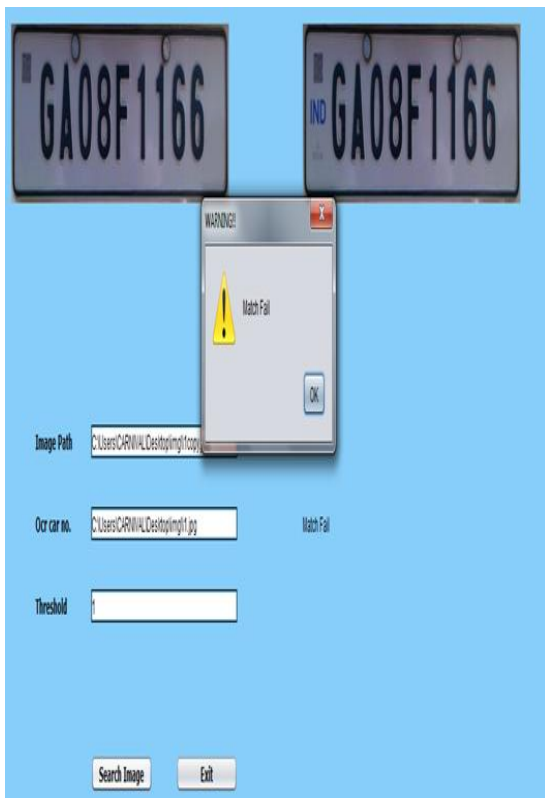**Figure 11:** Green LED indicates gate open

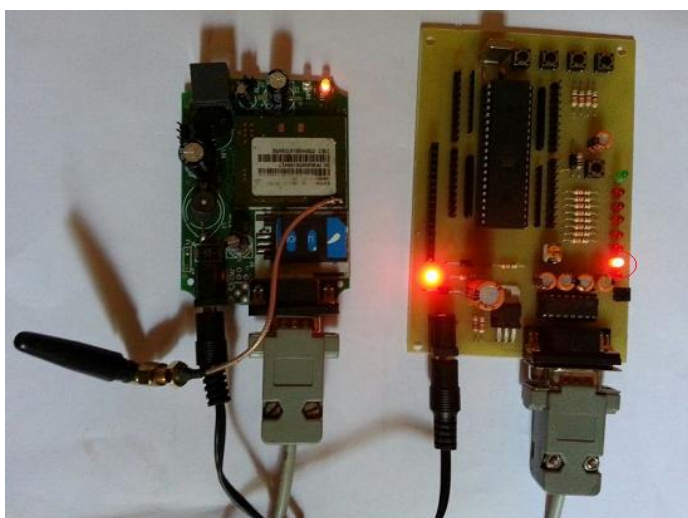**Figure 12:** Image comparison match failed



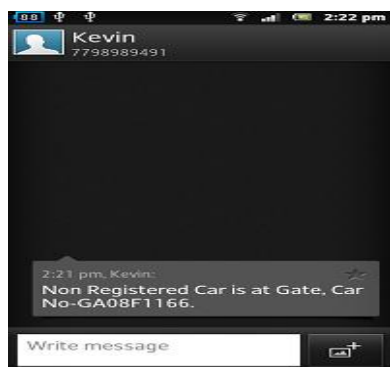**Figure 13:** Red led indicates Closing of gate



**Figure 14:** SMS to security personnel

## 7. Conclusion

The car number plate recognition system is capable of detecting an authorized car from a housing society, by recognizing the number plate of the car. It ensures an increase in security and management of the environment it is deployed in. It also decreases the overall cost and increases the efficiency. In further enhancement of the system a module can be added to automatically capture images of the number plates of the cars that have arrived at the gate. By including this module we can eliminate the need for loading the images manually in the application. A module can be added to determine the color of the vehicle. This color can be used to narrow down the search for a vehicle owner from the database, thus reducing the number of records to be scanned. The process of comparing two images can be further improved by using more advanced image comparing algorithms.

## References

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