IJITCE

ISSN 2347- 3657

International Journal of Information Technology & Computer Engineering

Email : ijitce.editor@gmail.com or editor@ijitce.com

International Journal of Information Technology & Computer Engineering

ISSN 2347–3657

Volume 12,Issue 2,May 2024

RFID VEHICLE STARTER SYSTEM

Project Guide

D. Rakesh

Assistant Professor

T. VARUN TEJA

V. SUBRAHMANYAM

A. SIVAREDDY

R. MANIKANTA CHOWDARY

ABSTRACT

Brief summary. Worldwide, people are starting to take notice of automated vehicle identification and monitoring systems as a result of the exponential growth in both car and traffic numbers. Many different kinds of automated systems for traffic control and vehicle identification are in use around the globe. One common method of identifying vehicles is number plate recognition (NPR), an embedded technology that works in real time. Vehicle identification is the only function of the previous systems. Radio Frequency Identification (RFID) and Near Field Communication (NPR) technology are used in the proposed system to identify and verify vehicles.

Keywords: Network Position Relay, Electro-tag, Radio Frequency Identification

Introduction

Assigning unique numbers to vehicles is a common practice in many countries for a variety of reasons, including but not limited to: traffic control, targeted visitor investigations, security control in restricted areas, enforcement agencies, toll collection, and car park management. Pakistan is no exception. The RTO (Regional Transport Office) is responsible for assigning these unique license plates to cars. Approximately half a billion vehicles are reportedly on the road today. A vehicle's identifying number serves as its principal means of identification. The vehicle's license plate serves as an official identifier for driving on public roads. No vehicle may be legally driven on public roadways without a clearly visible and legible number plate, which must be attached to the vehicle in a visible location, preferably on the rear.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Guntur Engineering College

Jawaharlal Nehru Technological University, Kakinada.

ISSN 2347–3657
Volume 12,Issue 2,May 2024

Computers are being considered by everyone as a means to process, sort, or analyze information. Having the information already stored in the computer makes many of these jobs much easier to do. In the context of vehicle management, the Number is obviously crucial identifying information that a computer approach must handle. Computers monitoring databases and processing knowledge of vehicle movements may automatically get this information from the content of the number plate thanks to NPR.

Especially in the realms of safety and traffic controller systems, NPR technology is steadily rising in favor. Parking lot access control, police enforcement, stolen car identification, traffic management, and toll collecting are common uses for the systems. Despite the fact that NPR and RFID systems have been utilized independently in different nations for the past forty years for the objectives described above, there is currently no mechanism in place to validate the data collected. NPR is a real-time embedded technology that can detect a vehicle's license plate on its own. Such technologies can't read license plates without first pinpointing their exact location and then identifying the typefaces used.

The field of computer vision and image processing is experiencing a period of exciting development with the Number Plate Recognition System (NPRS). This safe system integrates many technologies, including those for automated toll collecting, automated vehicle access, parking and vehicle ticketing, and law enforcement. Despite the abundance of literature on the subject, no one has yet suggested a method of verification. Because of this, we set out to create a system that could identify and verify car license plates using a specialized hardware unit [6].

1. **Literature Review**: The most important and also the most worrying portion of any number plate recognition system [11] is that the recognition and extraction of the vehicle number that directly affected overall systems

accuracy. Presence of noise, distorting within the image, irregular illumination, blurred and foggy environments build the job even tougher. During this work we tend to suggest a close and different technique for correctly police investigate the vehicle number plates. The projected system will work very correctly in effectively any atmosphere, daytime, and circumstances.

There are certain foreign, national or native standards for vehicles. In China, the fundamental standards [12] for the volume plate are

ISSN 2347–3657
Volume 12,Issue 2,May 2024

assumed. Certain native co-operations like European Public (EU), have number plates that outline the country, the place of registration, etc. during this text, Chinese, Pakistani, and Kuwaiti number plates are coated. The problem of automatic NPR is being discuses later in 90's [5], [8], [10].

The capture image being first processed to enhance and improve boundary line-information by mistreatment such algorithms because the gradient filter, and leading to a picture shaped of edges. The image so processed reborn to its binary matching half so processed by sure algorithms, like Hough rework, to observe lines. Eventually, couples of 2-parallel lines were thought of as a plate elect [6], [11]. Alternative technique supported the morphology of substances in a picture [1], [7].

Lightness, contrast, regularity, locations, and other pertinent attributes of license plate images are the focus of this method. Thanks to these possibilities, this approach may be used to detect the position of different plate sections and observe the parallel qualities in a very clear picture. The third method relied on the mathematical features of text that were backed by evidence [3, 4]. In this approach, text sections were subjected to mathematical manipulations based on text attributes such as grey level variance, boundary variety, area edge thickness, etc. Although this method is most often employed for text detection in images, it will soon be repurposed for the purpose of identifying potential variety plate locations that include both letters and numbers.

Several methods have been proposed to address this drawback, with some focusing on genetic algorithms and others on police investigation NPR abuse computers [2, 9]. In order to determine where the quantity plate elect space was, these systems used edge observation and edge information so artificial intelligence algorithms. The aforementioned systems all have their limitations; for instance, they are color-dependent, work only in specific environments or indoor pictures, etc., and the strategy we're proposing relies on the size, color, location, and position of the vehicle's license plate. Many research and methods have been proposed. The focus is mostly on plate localization, which is quite accurate in the NPR region. However, there is a lack of research on the topic of simultaneous verification and extraction. We need additional tests on this system, as the model implementation was expecting clear number plate text. Finding and improving upon text blocks inside an image is an important part of

ISSN 2347–3657
Volume 12,Issue 2,May 2024

the text extraction process. Automated license plate recognition (NPR) systems are really just a subset of TIE algorithms in operation. The NPR text extraction approach may take advantage of certain visual characteristics and limitations since it is application-specific to photos of number plates. There are a variety of approaches to natural language processing (NPR) text extraction, and each one makes use of a unique collection of observable characteristics to highlight text.
2. The issue must be defined. A standalone system is required to use certain image processing and computer vision procedures in order to extract numbers from license plates. To extract the license plate from a given picture, text segmentation and recognition algorithms are used. There is a dearth of prior research that covers every stage of an NPR system, from picture capture to identification.
Similarly, RFID technology is applicable to a wide range of industries. Vehicle parking, toll collection, and staff attendance are just a few examples of the many uses for radio frequency identification systems utilized across the world. The security personnel themselves are also subject to inspection and control via RFID. The security guard is able to patrol the application's obstacles. At each checkpoint, a security guard must scan an RFID tag using a reader as part of their sequential watch. Both systems perform well in their own areas, but when evaluated for their overall effectiveness, they only manage to identify data without providing any verification. Verifying the recognized Number Plate or RFID client is therefore the primary issue that has been discovered.

3. A system that combines image processing with Radio Frequency Identification (RFID) is called Number Plate Recognition (NPR) and it is used to identify and authenticate automobiles based on their license plates. Identification is based on the retrieved text, and verification is based on RFID data. Only vehicles equipped with RFID tags may use this technology.
A method for using an RFID tag system that can get vehicle specifications; this will allow us to compare the tag's data with that of an RFID reader. Developing a reliable system for identifying license plates in all lighting circumstances is the primary objective of this study. Image processing, character segmentation, and identification abilities come together in Number Plate identification (NPR) to identify cars based on their license plates. Vehicles don't require any additional hardware to be installed since the number plate information is utilized for recognition. The use of NPR technology is on the rise, particularly in systems that regulate traffic and ensure public safety. Non-public-relations networks

are utilized regularly for access control in parking areas, law enforcement, stolen car detection, traffic control, automatic toll collection and marketing

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 12,Issue 2,May 2024

work.

Suggested technique for authentication of number plates by RFID-tag and RFID system which is already implemented in different areas. RFID tags annexed to vehicles vehicle 'ID' mapped vehicle owner , group of owners, sanctioned personnel Scanning mechanism at entry/exit points for vehicle identification (RFID scanners to detect tags on vehicles) person identification, if required (RFID cards issued to vehicle owners).

1.1. Number Plate Recognition Systems.

Recent improvements in technology placed best cameras, and application of high reflective backgrounds in number plate have better accuracy of NPR systems. After the recognition method, the data can be more tested within remote databases and stored for future referencing. Usual NPR system is collection of some hardware and software components as showed.

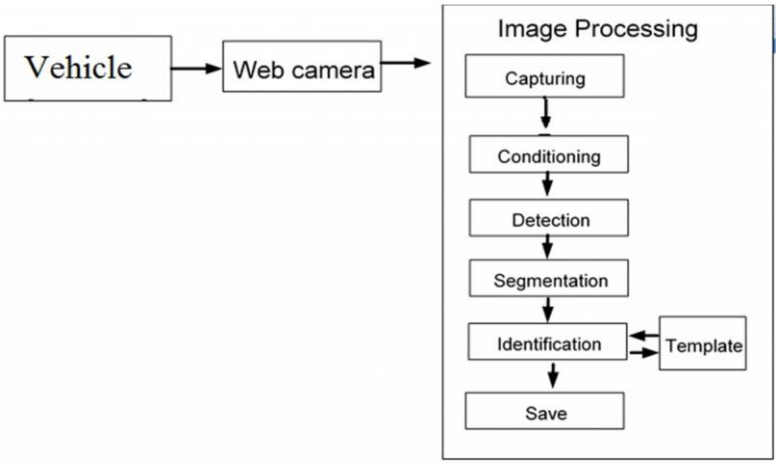


Figure 1: Block diagram of (NPR)

Usual NPR system works, when the vehicle came at the protected area, it starts the cycle by walking over a magnetic ring, sensor where RFID reader placed (which is the vehicle sensor). The detector senses the vehicle and refers signals to

ISSN 2347–3657
Volume 12,Issue 2,May 2024

the NPR unit. The NPR component activates light and capture image of the front rear plates of vehicle through the camera. The system examines the image with different algorithms, improves the image, identifies the plate location, extracts the plate string, and recognizes the fonts. The extracted number plate information will registered, stored along with the taken image are used for verification depends on the NPR application. The recognition is not unqualified and may contain errors due to problems in some of the NPR phases. Applications require working proper verification and control approaches in order to pay for the possible problems. If the system not detected tag than number plates are not properly recognized are processed.

1.2. Segmentation

Segmentation is useful in an array of computer vision applications, but fully automatic segmentation remains an arduous issue. There has been extensive work with picture segmentation and the broader issue of files partitioning. The aim of segmentation is usually to find groups which are usually both homogeneous, such that information within the same group are Similar & well separated, so that information in different teams are dissimilar. Lots of approaches are actually proposed, which may become broadly categorized as often contour- based, region-based or combining both. On the whole, the taken picture may cover several number menu candidates. The recognition algorithm usually clips some bands, as well as some plates from every band. There are predefined costs of number of applicants, which are discovered by study of predictions. The value is compatible to nine. There are usually some heuristics, which are used to choose the rate of certain applicants in line with their properties. These heuristics are actually selected commercial hoc in the coursework of the useful testing. The recognition sense categories candidates in line with their rate from

ISSN 2347–3657
Volume 12,Issue 2,May 2024

the best choice to the smallest appropriate. The best appropriate candidate is scanned by way of a deeper heuristic analysis. The particular proper analysis certainly allows, or discards the prospect. It examines single characters; this type of study consumes large level of processor time. The simple reasoning behind analysis can be showed from the following steps:

1) Determine doable variety plate candidates or contenders.
2) Classes consistent with their price (firm by a simple heuristics).
3) Changed the primary plate from the list with the most effective price.
4) Phase and analyze it by a deeper examine (time consuming).
5) If the proper study rejects the plate, come back to the step three.

Priority choice and basic

$$\alpha = 0.15 \cdot \alpha_1 + 0.25 \cdot \alpha_2 + 0.4 \cdot \alpha_3 + 0.4 \cdot \alpha_4$$

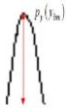
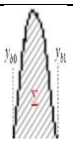
heuristic analysis of bands the basic analysis is employed to test the value of candidates, and to kind them consistent with this price. There are many freelance heuristics as shown in the table 1, which might be wont to evaluate the value α me. The heuristics is used singly, or they will be joint along to calculate Associate in nursing overall price of candidate by a weighted sum:

International Journal of Information Technology & Computer Engineering

ISSN 2347–3657

Volume 12,Issue 2,May 2024

Table 1. Heuristics, their design and explanation

Heuristics	Design	Explanation
$\alpha_1 = \lvert y_{b0} - y_{b1} \rvert$		The elevation of band in pixels. Bands With a minor elevation will be chosen.
$\alpha = \frac{1}{p_y(y_{bm})}$		The "*p y (y b m)"* is an extreme value of top of vertical projection of picture, which parallels to the processed Band. Bands with a higher amount of Vertical edges will be chosen.
$a = \frac{1}{\sum_{y=yb0} Py(}$		This heuristics is alike to the earlier one, but it reflects not only the value of the maximum peak, but a value of area below the graph among point's yb0 and y b1. These points describe a vertical Location of the estimated band.

1.3. **Methodology.** The proposed technique for the recognition and verification of number plates consists of thefollowing processes, as shown in Fig. 1.

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 12,Issue 2,May 2024

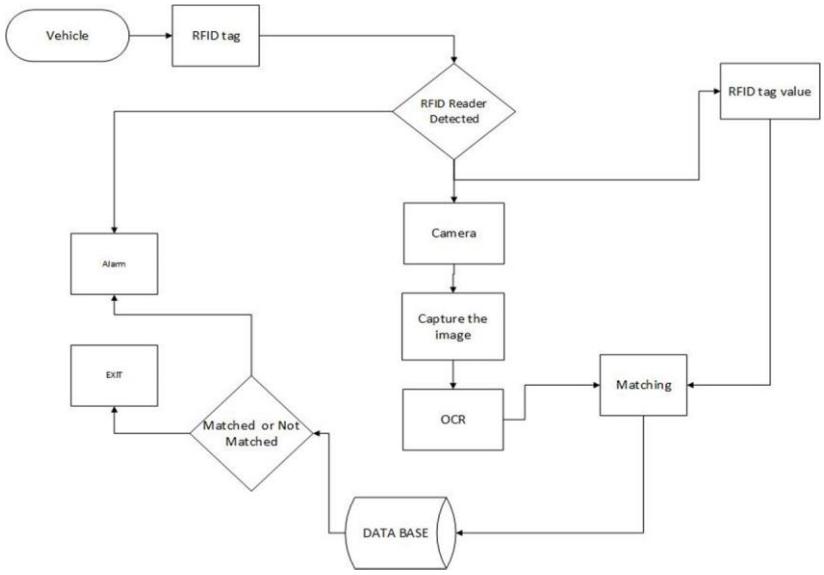


Fig 1: Data flow diagram

Steps for identification and verification

a. Input Image from file
   - Capture image from Camera
b. Change image into binary
   - Classify the intensity of the image
   - Change image into gray scale
   - Compute suitable threshold value for the image
   - Change the image into binary image by the calculated threshold
c. Identifying Number plate region
   - Fill small holes with amounts of number plate so that its area will be large to separate from figure.
   - Control width and height of the image.
   - Use the identifying number plate region for both horizontal and vertical direction.
   - Crop the necessary region.
d. Segmentation
   - Mesh the noise level existing in the image.
   - Slide the plate region in that way only numbers of plate region extracted.
   - Isolated every character on the number plate.
e. Number Recognition
   - Generate the pattern file from the stored pattern images.
   - Resize image grown from segmentation to the size of pattern.

ISSN 2347–3657
Volume 12,Issue 2,May 2024

- Match every character with the patterns.
- Store the finest matched character.

f. Save to file in certain format
- Create a file in write mode.
- Store the character grown from the number recognition method to text file in certain format.

g. Match Module
- RFID reader collected the data from RFID-tag.
- The data in RFID-tag will extracted.
- RFID value and data in text file will matched with each other.
- Either values will matched or not match it will show status.
- Application Close.

1.4. Result

a. Verification module

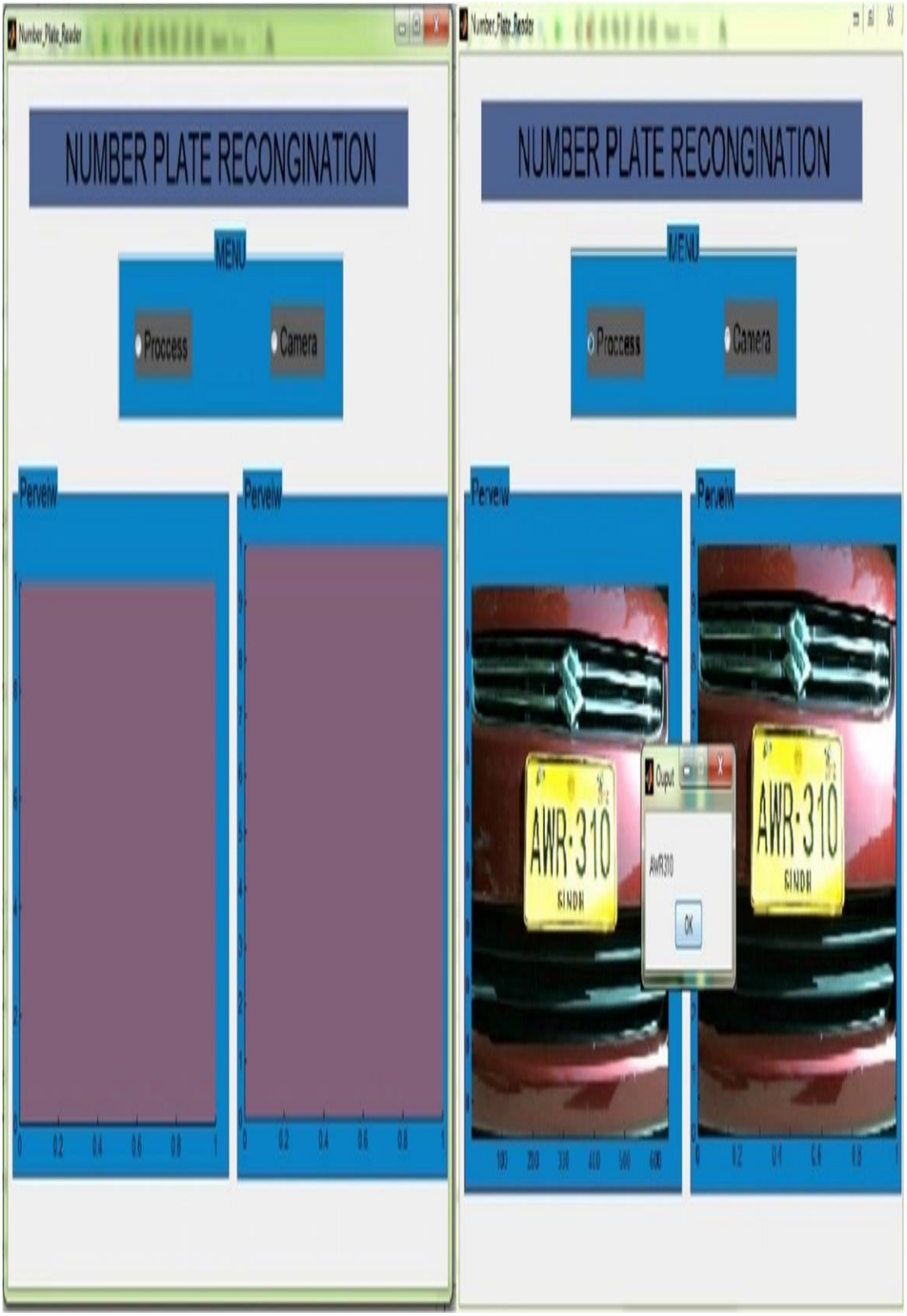
In this module the both values (RFID tag value and extracted values which taken from image) will checked, If the RFID value and (OCR) extracted value same the status show matched and otherwise the will not matched status appear as not matched. Result will show in following Figures 4,5 and 6.

1.5. Graphical User Interface (GUI)

When RFID tag detected camera automatically capture the image form car and display in another axes, after that process will be started. When processing will completed the extracted value which taken from image will exposed in figure after that extracted value will save in data base. The result exposed in following Figures 2 and 3.

International Journal of
Information Technology & Computer Engineering

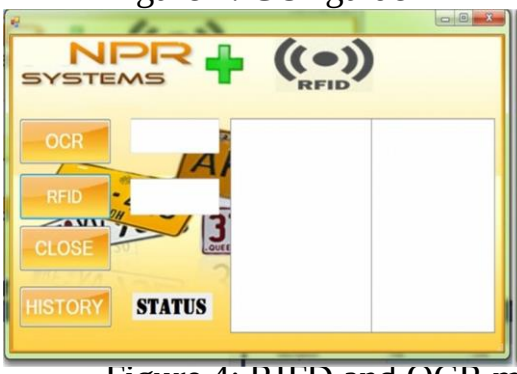
ISSN 2347–3657
Volume 12,Issue 2,May 2024



International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 12,Issue 2,May 2024

Figure 2: GUI guide

Figure 3: (OCR) extracted output



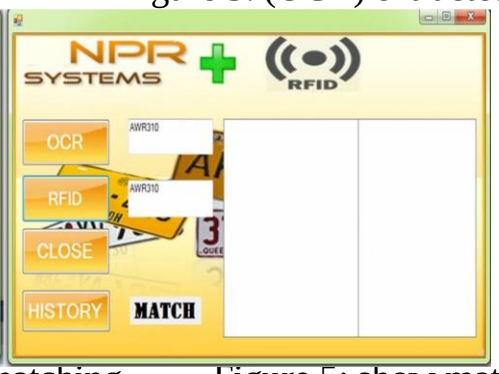


Figure 4: RIFD and OCR matching

Figure 5: show matched view

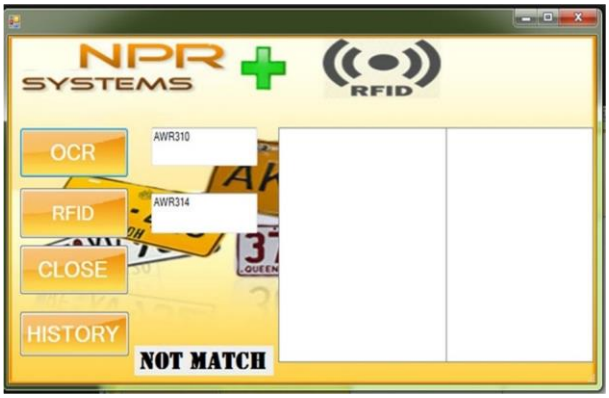


Figure 6: If RIFD and OCR not matching

Table 2. Characteristic of Misreads

	Percentage Misreads	Cumulative percent
Illegal font	72.6	72.6
Marks	23.0	95.6
Obscured	1.8	97.4
Broken	1.8	99.1
Screw cap	0.9	100.0

ISSN 2347–3657
Volume 12,Issue 2,May 2024

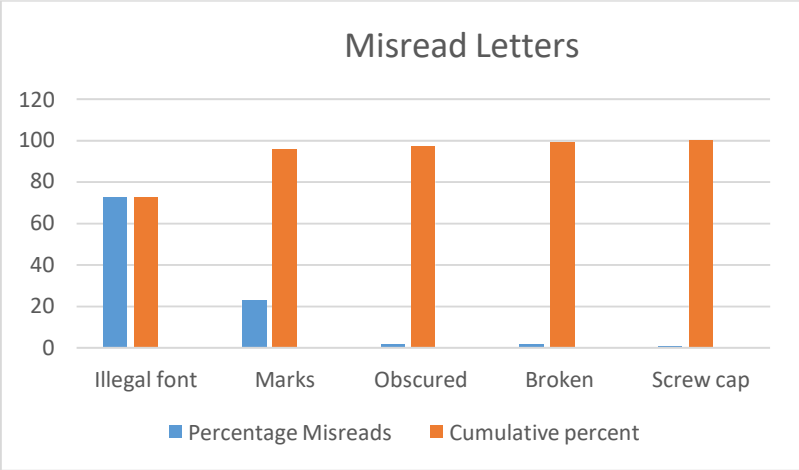


Figure 7: Position of misread letters

Conclusion

An effective, quick, easy, and hardware-friendly solution for recognizing car license plates was the primary goal of the study. I. A number plate recognition system (NPRS) and (ii) radio frequency identification (RFID) have each been collected separately as part of the project. Both units are functioning simultaneously. Academic and business communities have begun to pay greater attention to number plate recognition systems because of the wide range of applications they can handle. Induced real-time NPRS implementation methodologies and methods for investigating. Even if the selection algorithm is superior at runtime, there are other approaches that may provide similar outcomes. The trials employed a variety of methods for optimizing and segmenting images, as well as methods for picture enhancement. Quick and precise results may be generated by an NPR vehicle identification system. The optimization of the number plate was based on its form and limitations in this research. Foreign license plates with a variety of fonts and sizes of characters have a lower likelihood of occurrence. Improvements in application identification speed and accuracy will allow for the incorporation of more limitations in the future. The most pressing issue is the NPR character recognition system. This is a very difficult problem in the field of NPR, since there is a great deal of variation in illumination and picture quality.

2. REFERENCE

(August 2004) Hongliang and Changping. A combination of edge statistics and morphology-based license plate extraction methods. Volume 4, Issue 4, of Pattern

ISSN 2347–3657
Volume 12,Issue 2,May 2024

Recognition (2004). Volume 2, pages 831–834, of the 17th International Conference on Public Relations (ICPR 2004). IEEE. Clark and Mirmehdi (2000) published a study in September in the year 2000. Using localized metrics, locate text areas. Page numbers 675–684 from the 11th British Machine Vision Conference proceedings. Referenced in [3] are Clark and Mirmehdi (2000). Finding text areas in images using a combination of statistical techniques. Volume 1 of the proceedings of the fifteenth international conference on pattern recognition (pp. 450–453) was published in 2000. IEEE.
The authors of the cited work are Duan, T. D., Du, T. H., Phuoc, T. V., and Hoang, N. V. (February 2005). Constructing a system for the automated identification of vehicle license plates. In the proceedings of the International Conference on Computer Science RIVF, pages 59–63.
The authors of the cited work are Duan, Duc, and Du (2004, October). Implementing a hybrid approach that combines contour algorithm and Hough transform for license plate detection. The proceedings of the 2004 International Symposium on Intelligent Multimedia, Video, and Speech Processing, volume 7, pages 747–750. IEEE.
Sixthly, Castleman, K. (1993). Picture processing in the digital realm
The authors of this work are Gonzalez and Richard (2002). Prentice Hall Press, Woods (ed.), digital image processing, ISBN 0-201-18075-8.
[8]. J. C. Lee (1999). Recognition of real-world containers and vehicles, both moving and still, using automatic character recognition. With respect to Neural Networks, 1999. volume 4, pages 2824–2828, International Joint Conference on Concurrent Neural Networks, 1999. IEEE.
[9]. The authors of the 1998 June article are Parisi, R., Lucarelli, G., Di Claudio, E. D., and Orlandi, G. Car plate identification via neural networks and image processing. To be published in the year 1998 by Circuits and Systems. 195–198 in ISCAS'98: Proceedings of the IEEE International Symposium on in 1998, Volume 3. IEEE.

(1997). Federl, J. P. P. [10]. Developing a Method for VIN Recognition [11]. In 2001, Remus was the author. System for recognizing license plates. Section 203-206 of the proceedings of the 2003 International Conference on Information, Communications, and Signal Processing.
[12]. The authors of this work are Sulehria, Ye Zhang, and Sulehria (2008). Matrix morphology and neural networks for license plate identification in vehicles. WSEAS Computer Transactions, 7,