International Journal of Advanced Trends in Computer Applications
www.ijatca.com

Review of Upcoming challenges in a automatic License Plate Detection System

[1]Komal Jaswal, [2]Vijay Kumar Singh, [3]Sanjay
[1]SIEET Naulakha, Sunder Nagar, Mandi (HPTU)
[2]Assistant Professor
[3]Assistant Professor
[1]jaswal.komal5@gmail.com, [2]vijaysingh13feb1991@gmail.com, [3]samjess.jess@gmail.com

Abstract: *This paper presents detailed audit in the field of Optical Character Recognition. Different systems are confirmed that have been proposed to understand the focal point of character acknowledgment in an optical character acknowledgment framework. Despite the fact that, adequate studies and papers are depicts the systems for changing over printed content from a paper record into machine decipherable structure. Optical character acknowledgment is a procedure where the PC gets it naturally the picture of written by hand script and move into characterize character. This material use as an aide and upgrade for peruses working in the Character Recognition zone. Determination of an important component extraction technique is likely the single most imperative component in accomplishing high character acknowledgment with vastly improved precision in character acknowledgment frameworks with no variety.*

I. INTRODUCTION

In the present era, the clogging emergence of vehicular traffic has become a major source of concern among the people residing in the capitals, metropolitans and the big cities, which in turn is accompanied by regular peril road accidents thereby causing loss of lives of many. Not only the lack of rules of traffic safety but also the emerging increases in the number of high speed road vehicles are causing hazardous increase in the number of road accidents, which obviously poses a severe threat to the environment. The other penalties one has to bear or pay because of these are environmental pollution, energy waste and energy loss.

The count of motor vehicles in the developing countries has increased at an enormous rate in the last few decades in accordance with that of technical expertise. This builds up a desire to identify the vehicle in correspondence to the number of the vehicles. The main motive behind the recognition of vehicle was to sort out the prime issues that include safety, security, speed detection, violation of the traffic rules, etc [1]. The over emergence in the number of vehicles in the metropolitan cities requires a serious initiative, i.e. to launch an effective automatic system for the efficient arrangement and management of the traffic. Hence, VLPR Systems, abbreviated as Vehicle License Plate Recognition System can be taken into account, which primarily works by capturing the vehicular images and thus, interprets the licence plate's registration number automatically [2].

The prime owner of the vehicles providing facilities to the passengers by means of taxi services need to register their vehicles annually either by the Department of the Motor Vehicles or by the State Bureau. This agenda has been initiated and implemented by the law agencies and orders the owners to affix a License Plate on the Vehicles that are visible both to the public as well as to the legal governing bodies and staff [3]. New York is considered as the first state to ratify, pass and endorse the Vehicle Registration Legislation on 25th April, 1901, later California followed the footsteps in 1902.

II. Automatic Licence Plate Recognition (ALPR) Technology

The Automated license plate recognition (ALPR) technology was first invented in the year 1976, by the Police Scientific Development Branch (PSDB), Home Office, United Kingdom [4]. An AVLPR System can be defined as a kind of mass surveillance technique which keeps a track of the Licence Plate images by employing OCR (Optical Character Recognition) scheme.

A typical AVLP (Automatic Vehicle License Plate) System basically consists of a License Plate with:

- a series of both alphabets and numeric characters that provides the reference to the
  - Vehicle Identification Number (VIN),
  - the manufacturing year,
  - the model number
- Vehicle registration number

- The information about the owner or the proprietor of the vehicle.

Other Names Given to AVLPR System:
AVLPR (Automatic Vehicle License Plate Recognition) System is known with different other names, which include:

- **ALPR**-Automatic License Plate Recognition
- **LPR**- License Plate Recognition
- **AVI**- Automatic Vehicle Identification
- **CPR**- Car Plate Recognition
- **ANPR**- Automatic Number Plate Recognition
- **CPR**- Car Plate Reader
- **OCR**- Optical Character Recognition (for Cars).

Modules of the AVLPR (Automatic Vehicle License Plate Recognition) System:
The three main subjects mainly considered in the Automatic Vehicle License Plate Recognition (AVLPR) System include [5]:

- To detect the location of the Licence Plate via vehicular digital images
- Character Segmentation from the localised Licence Plate images
- Optical Character Recognition (OCR) from the characters extracted by the above process.

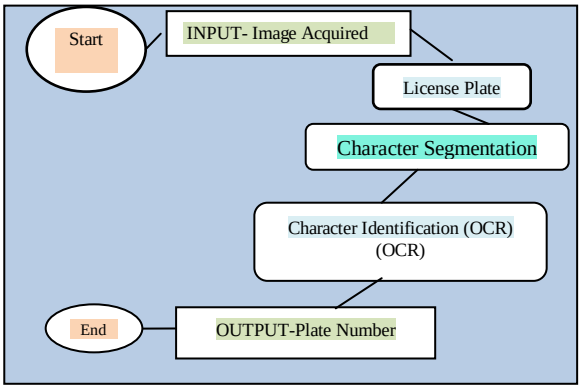

Figure 1: Flowchart representing an AVLPR System

The localization task of the license plate in the vehicular digital images basically involves the implementation through the solutions of edge extraction, the morphological and the Sobel operators. The edge extraction scheme is considered to a simpler and a fast one whereas the Sobel Operator provides an optimistic impact on the generated images. The localization work of the license plates through the consideration of morphological based scheme is not liable and prone to noise but provides an extreme closeness during the process of execution.
After the completion of the License Plate localization, the process which is taken into consideration is the character segmentation process. Basically, this process implies heavily on the histogram computation and thresholding but recent advanced protocol involves the implementation of the artificial neural networks [7].
The final task in the AVLPR (Artificial Vehicle Licence Plate Recognition) System is the completion of the process of the character recognition. In order to deal with the variations faced among the characters in the different license plates, the segmented characters are required to go through some stages of pre-processing that includes normalization and the skew correction. These pre-processing steps prove to be of great help in reducing the analytical and the computational duration [8].

III.Literature Review

Salah Al-Shami et al. [18] proposed a novel image extraction algorithm in License Plate Recognition System. Here, the character recognition description is provided with weightage and the proposed scheme focuses on real, authentic and existent license plates. The number limit here is restricted to ten classes, i.e. 0 to 9. There is no doubt in the fact that the character recognition task witnesses a lot of problems and difficulties, also, many researchers have worked will full authenticity to sort out this problem. A kind of such method implemented for character recognition from a closed set was the one that focused on lines but this system too suffered from several drawbacks. One of which was the selection procedure involved manual process, on account of which the total lines and the thresholds for every single attribute in each number line involves selection physically. The prime motive behind the scheme is to generate the best possible and the most favourable character recognition tree through the implementation of a classification process manually. Various stages are included in the recognition scheme of a character. The first step, i.e. in the image extraction process includes the involvement of two unique features. In the initial feature, the quantization process occurs based on a definite characteristic and attribute, however, in the next feature, several attributes are blended and summed up together to form a new characteristic feature. The proposed protocol was employed on several datasets in the License Plates of KSA and the rate of character recognition was predicted to be greater than 95%. Hence, the generated results demonstrated the accurate and the efficient nature of the proposed protocol in comparison to the classical proposed schemes.
S. Kranthi et al. [19] proposed the algorithm for the recognition of character in the Vehicle License Plates. This system of recognition is provided the name ANPR, which stands for Automatic Number Plate Recognition. Automatic Number Plate Recognition (ANPR) is a mass monitoring system that works by capturing the vehicular images and thereby, recognizing the license number. The

proposed proves beneficial in solving out the cases of stolen vehicles, hence reducing crime and helps in the efficient law enforcement. The current scheme proposes a recognition technique through the implementation of which the image of the vehicular license plate is captured (with the help of digital cameras) and later the image acquired is processed in order to fetch out the license plate information. The image of the vehicle acquired here is a rear one and various protocols and algorithmic schemes are employed in order to carry out the task of image processing efficiently. In the proposed work, a unique "feature-based license plate localization" method has been taken into consideration which primarily targets on two prompt techniques, that includes the Edge Finding technological method and the Window Filtering method in order to develop the vehicle number or license plate recognition system in a better manner.

BolotovaYu.A. et al [20] proposed a hierarchical temporal memory model in order to bring about the recognition of vehicle license or the number plate in an efficient manner. In the present scenario, one of the challenging chores is to develop a high-quality and an accurate character recognition system for the vehicle number plates. The recognition procedure of the vehicle number plates involves various steps, i.e. localization of the license plate, character segmentation and recognition. The proposed scheme includes the procedures associated with the allowance of the number plate, the character segmentation and its recognition. The main problems encountered during the development of these algorithms include the obscuring onto the license plate and the angular inclination. The paper primarily focuses on developing a novel method for the number plate recognition system through preliminary image filtering, character segmentation by connected component process and character recognition by means of hierarchical temporal memory model. The prefiltering of the acquired images helped in improving the effectiveness of successive binarization procedure. Character segmentation in the license plates is generally demonstrated through the histogram technique, by means of various inclination angles of the number plate. Hence, the rotation of the number plates leads to a decrease in the quality of the image. However, the consideration of the connected component technique completely boycotts the rotation procedure and therefore, causes no loss in the quality of the image. The identification process can be made complicated by assigning different codes and symbols to the images under a small angle after the completion of the character segmentation process. The proposed hierarchical temporal memory model for the recognition of characters in the license plates, earlier practiced for the inclined images, generates favourable outcomes and witnesses higher accuracy, and can therefore, be practiced for distorted script segmentation and recognition processes.

Shih-Jui Yang et al [21] proposed a realistic and sensible correction technique for the LPR (License Plate Recognition) systems that relied on the homographic method. The technique of Automatic License Plate Recognition proves beneficial in evading the drawbacks encountered due to manual number plates, which includes faults caused by pressing the keys incorrectly or in a slow manner. However, several vertical and horizontal angular distortions predictably arise between the number plates of the vehicle and the surveillance cameras, thereby causing degradation in the accuracy and the reliability of the Vehicle License Plate Recognition System. The current research proposal presents a Homography-Based Correction Technique for the License Plate Recognition. The proposed work highlights and proposes three practical supplementary and auxiliary protocols which help to overcome the disparity faults faced by the Vehicle Number Plate Recognition System and the applications habitually. The initial method involves the isolation through the YCbCrcolor space in order to surmount the colour variation in the background of the license plates, for eg., white, red or green. In the second technique, the equalization of the sub-regional histogram is brought about to efficiently deal with the contrast frame variation between the number plates and the vehicle, for eg.silver, black or white. The last method includes the localization through the implementation of a four-corner technique in order to surpass the deviation encountered in the frame shapes of the vehicular number plates, either caused due to stains or by reflections. The proposed scheme analysed the perspective correction rate in the number plates of both automotive and motorbike that were found about 98% and 94% respectively. However, after the application of the corrected technique, the correction rate in the automotive and the motorbike license plate database were found to be 97% and 89% respectively. Therefore, these results demonstrate the accuracy, usefulness and the reliable nature of the protocol in terms of sorting out the deformation faults faced in the ALPR (Automatic License Plate Recognition) System better than the classical proposed schemes.

AmrBadr et al [22] proposed and introduced an ANPR (Automatic Number Plate Recognition) System for localization and character segmentation in the license plates. This is brought about through the implementation of morphological techniques, the histogram manipulation and the edge detection method. However, for the character differentiation and recognition process artificial neural networks are taken into consideration. In the present scenario, the boundless increase in the count of vehicles makes it impossible to manage the transportation system efficiently. Hence, this

all accounts for a need of the recognition of the number plate of the vehicles in order to sort out the emerging issues and complexities encountered in the daily life and to deal effectively with the traffic management, car parking, vehicle toll collection system, violation of traffic rules, border checkpoints, controlling the criminal activities, like thefts, vehicle stealing, etc. Inspite of all this, accomplishing the above system is a challenging task since the image acquired for the localization faces a differentiation in the format of the license plates, i.e., difference in the scripts, angular inclination and irregular lighting conditions, etc. the proposed system has been experienced on the stagnant and the stationery images of the vehicles, which further have been alienated into various sets on the basis of complexities. It was observed that the blurred and skewed images group generated poor recognition rate as compared to those images that were taken clearly. The main focus of the proposed analytical work was not to generate fully accurate recognition snapshot sets but to examine the invariance of the protocol on random images that are differenced methodically into the sets on the basis of their properties.

Conclusion

This is detailed discussion about handwritten character recognize and include various concepts involved, and boost further advances in the area. The accurate recognition is directly depending on the nature of the material to be read and by its quality. Current research is not directly concern to cursive handwriting and to recognize the child handwriting which requires high supervised system. From various studies we have seen that selection of relevant feature extraction and classification technique plays an important role in performance of character recognition rate. This review establishes a complete system that converts scanned images of handwritten characters to text documents. In this paper, we have studied various papers with different algorithm. Each technique have own porn's and con's. But, still there are many premature problems, when multiple optima exist.

References

[1] Kayhan Bora, work on "Car Plate Recognition", A Master's Thesis in Computer Engineering, 2009.

[2] Tran DucDuan et al., "Building an Automatic Vehicle License-Plate Recognition System", presented at International Conference in Computer Science, RIVF'05 on February 21-24, 2005, Can Tho, Vietnam.

[3] David J. Roberts and Meghann Casanova, "Automated License Plate Recognition Systems: Policy and Operational Guidance for Law Enforcement", a research report submitted to the US Department of Justice, in September 2012.

[4] Ch. Jaya Lakshmi, A. Jhansi Rani, K. Sri Ramakrishna, and M. KatiKiran, "A Novel Approach for Indian License Plate Recognition System", VI International Journal of Advanced Engineering Sciences and Technologies, 10-14, 2011.

[5] LihongZheng, Xiangjian He; Qiang Wu, WenjingJia; Samali, B., Palaniswami, M., "A Hierarchically Combined Classifier for License Plate Recognition", Computer and Information Technology, 2008. CIT 2008, 8th IEEE International Conference on 8-11 July 2008 Page(s):372-377 Digital Object Identifier 10.1109/CIT.2008.4594704.

[6] SaeedRastegar, Reza Ghaderi, GholamrezaArdeshipr&NimaAsadi, "An intelligent control system using an efficient License Plate Location and Recognition Approach", International Journal of Image Processing (IJIP) Volume(3), Issue(5) 252, 2009.

[7] H.; Gecim, H. S., Alkar, A. Z., "Efficient Embedded Neural-Network-Based License Plate Recognition System Caner", Vehicular Technology, IEEE Transactions on Volume 57, Issue 5, Sept. 2008, Page(s): 2675–2683 Digital Object Identifier 10.1109/TVT.2008. 915524.

[8] SaeedRastegar, Reza Ghaderi, GholamrezaArdeshipr&NimaAsadi, "An intelligent control system using an efficient License Plate Location and Recognition Approach", International Journal of Image Processing (IJIP) Volume(3), Issue(5) 252, 2009.

[9] Dai Yan; Ma Hongqing, Liu Jilin, Li Langang, "A high performance license plate recognition system based on the web technique" Intelligent Transportation Systems, 2001. Proceedings 2001 IEEE 25-29 Aug'2001, Page(s):325-329, Digital Object Identifier 10.1109/ITSC.2001.948677.

[10] A. S. HadiSharifiKolour, "An evaluation of license plate recognition algorithms", International Journal of Digital Information and Wireless Communications (IJDIWC), pages 281–287, 2011.

[11] Tran DucDuan, Tran Le Hong Du, Tran VinhPhuoc, Nguyen Viet Hoang "Building an Automatic Vehicle License-Plate Recognition System", February 2005

[12] Fukunaga K., "Introduction to Statistical Pattern Recognition", Academic Press, San Diego, USA, 1990.

[13] Plate Geometry and Basic Syntax (http://www.platerecognition.info/1102.htm).

[14] Applications of AVLPR System, (http://www.anpr.net/anpr_09/anpr_applicationareas.html)

[15] SatadalSaha, SubhadipBasu, MitaNasipuri, and Dipak Kumar Basu "An Offline Technique for Localization of License Plates for Indian Commercial Vehicles".

[16] CristianMolder, powerpoint presentation on the topic, "An Automatic License Plate Recognition Plate Recognition (ALPR) System".

[17] Drawbacks faced in License Plate Recognition (https://en.wikipedia.org/wiki/Automatic_number_plate_ recognition).

[18] Salah Al-Shami, Ali El-Zaart, RachedZantout, Ahmed Zekri and KhaledAlmustafa, "A New Feature Extraction Method for License Plate Recognition", IEEE, 2015.

[19] S.Kranthi, K.Pranathi, A.Srisaila, "Automatic Number Plate Recognition", International Journal of Advancements in Technology, ISSN 0976-4860.

[20] BolotovaYu.A., Druki A.A. and Spitsyn V.G., "License Plate Recognition with Hierarchical Temporal Memory Model", The 9th International Forum on Strategic Technology (IFOST), October 21-23, 2014, Cox's Bazar, Bangladesh.

[21] Shih-Jui Yang, Chian C. Ho, Jian-Yuan Chen and Chuan-Yu Chang, "Practical Homography-Based Perspective Correction Method for License plate Recognition", IEEE, 2012.

[22] AmrBadr, Mohamed M. Abdelwahab, Ahmed M. Thabet, and Ahmed M. Abdelsadek, "Automatic Number Plate Recognition System", Annals of the University of Craiova, Mathematics and Computer Science Series Volume 38(1), 2011, Pages 62–71, ISSN: 1223-6934.

[23] NimaAsadi, student of Intelligent Embedded Systems, Mälardalen University Västerås, Sweden "A Study of Automatic License Plate Recognition Algorithms and Techniques", 2011.

[24] ThanongsakSirithinaphong and KosinChamnongthai, "The Recognition of Car License Plate for Automatic Parking System", Fifth International Symposium on Signal Processing and its Applications, ISSPA '99, Brisbane, Australia, 22-25 August, 1999.

[25] Lisheng Jin, Huacai Xian, Jing Bie, Yuqin Sun, HaijingHou and QingningNiu, "License Plate Recognition Algorithm for Passenger Cars in Chinese Residential Areas", Published 15, June'2012, Sensors 2012, 12, 8355-8370; doi:10.3390/s120608355.

[26] Tran DucDuan, Tran Le Hong Du, Tran VinhPhuoc and Nguyen Viet Hoang, "Building an Automatic Vehicle License-Plate Recognition System", presented at International Conference in Computer Science, RIVF'05 on February 21-24, 2005, Can Tho, Vietnam.

[27] Fredrik Trobro, thesis report on "Real Time Automatic License Plate Recognition in Video Streams", published on September 23, 2007.

[28] Harvey A. Cohen, "One-pass Gray-Scale Image Segmentation", In Proc DICTA-93, Pages 572-578, Sydney, Dec'1993.