

Vehicle Number Plate, Speed Detection & E-mail Alert using Machine Learning & HTML

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Abstract: *The value of data has increased exponentially in recent years. Organizations are using online data to enhance their product and data interpretation. If traffic data from cars on the road can be easily obtained from videos, it can be very useful. In contrast to regular data traffic, surveillance videos contain an enormous volume of data that remains unprocessed, resulting in information loss. The aim of our project is to develop a method for retrieving vehicle data from videos that is both efficient and reliable. The vehicle's license plate number, colour, manufacturer's name, and time-stamp are all included in this information. The information will then be used for a variety of purposes. This information would aid in a more in-depth examination of road traffic. This research would aid in the gathering of information that will aid in the improvement of road transportation in the future. Additionally, since the data is in text format, searching and altering the data can be both quicker and quicker. This altered data may be correlated with video data if necessary. Without the text data, the above procedure will need less scrubbing through the video to achieve the desired stage. Furthermore, data stored in text format is much smaller than data stored in video format. Our project's implementation would contribute to the development of a smart traffic grid. The requisite data is then retrieved from each vehicle's photographs. The vehicle's license plate is first detected. The license plate after some pre-processing Video Surveillance is a very popular research topic in computer vision applications that continuously tries to detect and track down the targets.*

Keywords: Vehicle Number Plate Detection, Vehicle Speed Detection, etc.

I. INTRODUCTION

Development People from different countries interact in a multicultural environment to develop solutions to never-ending problems for men. The Open-Source section is a one of the outstanding contributions in the scientific world is Python. Computer vision in the Intel's research has been producing a fruit called Open Computer Vision (Open CV), which can support the development of computer vision [1].

At present, the use of vehicles is increasing throughout the country. All of these vehicles have a unique vehicle identification number as their main identifier. The ID is actually in the license number that refers to a legal license to participate in the public movement. Each vehicle in the world must have its own number plate that must be installed on its body (at least on the back). They need to

Identify the vehicles are increasing in parallel with the number of vehicles. This identification system helps with safety, automatic switching systems, highway speed detection, light detection, stolen vehicle detection, and human and non-human loss collection systems. The auto license plate recognizing system replaces the manual license plate number writing process in the computer system.

In order to obtain an appropriate personal recognition, the license plate identification technique consists of three main topics. They are, find the location of the panel of digital images, segmentation the characters from the pictures of the panel and the visual character Recognition [2]. The most dominant and basic step is to determine the exact location of the number plate in the captured image. The localization of a license plate has been recognized either by structural analysis and color analysis method. In the License panel area, unwanted spots are removed by parsing the connected component. ANPR is a collective control system that captures the vehicle image and identifies the license number.

Some ANPR system applications are automatic traffic control and tracking system, highway toll collection / automatic parking systems, petrol station automation, flight time monitoring. These systems automate the process of identifying vehicle license number, making it fast, cost effective.

II. LITERATURE SURVEY

A research paper is a document of a scientific article that contains relevant expertise, including substantive observations, and also references to a specific subject of philosophy and technique. Use-secondary references are reviewed in literature and no current or initial experimental work is published.

1. Paper Name: An Efficient Approach for Automatic License Plate Recognition System

Author: B. Pechiammal, Dr. J. Arokia Renjith

Abstract: Auto Recognition of License Plate is a kind of image processing technology for recognizing the number plate information from images or videos. The observed plate images are normally in low resolution and suffer severe loss of edge data, which cast, incredible test to existing vehicle number plate detection and recognition patterns. The process of Auto recognition of License plate requires a high level of precision, when there are various vehicles going in a brief span and number plate abstraction is a number is a difficult task, basically because of number arrangement, and impact of environmental work. This step influences the accuracy of character separation and acknowledgment framework. This paper introduces an algorithm for Auto recognition of license plate system utilizing various approaches. Auto recognition of license plate method comprises of three segments: Character segmentation, Optical character recognition and template matching. The proposed framework presents the automatic vehicle number plate identification system utilizing a vehicle number plate extraction. Another strategy utilizing Gabor filtering for character recognition in gray scale image is proposed in this paper. Components are separated directly from gray-scale character images by Gabor filters which are exceptionally intended for measurable data of character structures. Template matching is a system which is exploited to find a sub image of a target image which coordinates a template image. Experiment result outcomes to show the superiority of our proposed approach as far as effectiveness.

2. Paper Name: Accurate Detection and Recognition of Dirty Vehicle Plate Numbers for High-Speed Applications Rahim Panahi

Author: Rahim Panahi

Abstract: This paper presents an online highly accurate system for automatic number plate recognition (ANPR) that can be used as a basis for many real-world ITS applications. The system is designed to deal with unclear vehicle plates, variations in weather and lighting conditions, different traffic situations, and high-speed vehicles. This paper addresses various issues by presenting proper hardware platforms along with real-time, robust, and innovative algorithms. We have collected huge and highly inclusive data sets of Persian license plates for evaluations, comparisons, and improvement of various involved algorithms. The data sets include images that were captured from crossroads, streets, and highways, in day and night, various weather conditions, and different plate clarities. Over these data sets, our system achieves 98.7 plate detection, character segmentation, and plate recognition, respectively. The false alarm rate in plate detection is less than 0.5 data sets is 91.4 year. The proposed algorithms for each part of the system are highly robust to lighting changes, size variations, plate clarity, and plate skewness. The system is also independent of the number of plates in captured images. This system has been also tested on three other Iranian data sets and has achieved 100 in both detection and recognition parts. To show that our ANPR is not language dependent, we have tested our system on available English plates data set and achieved 97

Index Terms: Digital signal processors, plate detection, automatic number plate recognition, RANSAC, support vector machine (SVM).

3. Paper Name: Improved OCR based Automatic Vehicle Number Plate Recognition using Features

Trained Neural Network

Author: Bhavin V Kakani

Description: Significant research and development of algorithms in intelligent transportation has grabbed more attention in recent years. An automated, fast, accurate and robust vehicle plate recognition system has become need for traffic control and law enforcement of traffic regulations; and the solution is ANPR. This paper is dedicated on an improved technique of OCR based license plate recognition using neural network trained dataset of object features. A blended algorithm for recognition of license plate is proposed and is compared with existing methods for improve accuracy. The whole system can be categorized under three major modules, namely License Plate Localization, Plate Character Segmentation, and Plate Character Recognition. The system is simulated on 300 national and international motor vehicle LP images and results obtained justifies the main requirement.

Keywords: Automatic Number Plate Recognition (ANPR), Optical Character Recognition (OCR), License Plate (LP), Binary Image, Number Plate Localization (NPL), Segmentation, Neural Network (NN)

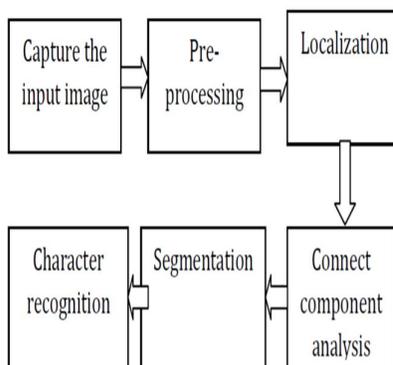
4. Paper Name: Application independent localisation of vehicle plate number using multi-window-size binarization and semi-hybrid genetic algorithm

Author: Gibrael-Elamin Abo-Samra

Description: This study introduces an enhanced version of a previously published genetic algorithm-based technique to allow fast and accurate detection of the vehicle plate number independently of the used application. Hence, significant enhancements are introduced to upgrade the genetic algorithm into a semi-hybrid category by preceding it with a sorting and subgrouping process that reduces the search space and following it by a rule-based local search to optimize its output. The updated population structure and its initiation with subsets of the sorted image foreground objects results in a linear relationship between the image complexity represented by the number of foreground objects and the genetic algorithm search space instead of being exponential in previous versions. Moreover, a novel extra variable-size-window adaptive binarisation step is introduced to overcome the problems of attached license symbols that cannot be solved by the skipping ability introduced in previous versions. Various image samples with a wide range in scale, orientation, and symbol connectivity have been experimented to verify the effects of the new improvements. Encouraging results with 99.2.

III. PROBLEM STATEMENT

In this section, we first design A Machine Learning Methodology for vehicle number plate and speed detection.



IV. PROPOSED SYSTEM

- First Step: Capture the vehicle image as an input.
- Second Step: Convert RGB Image into Gray.
- Third Step: Set the threshold level before segmentation. In this algorithm the maximum threshold level is 500.
- Fourth Step: Segmentation method is used to make segments of cropped Image. The Segmentation part split the all characters of vehicle number plate and further these segmented characters are used for the Recognition.
- Fifth Step: At last, the OCR technique is used for recognition

Speed Detection:

The below shown figure (fig 1) demonstrates the block diagram of our vehicle speed detection system. The block diagram below explains that firstly, a video is given as input to the system. The given input video is at first preprocessed according to the requirements. From the processed video sample, the vehicle is detected using the filters. This vehicle is then tracked and analyzed in order to find its speed and an email alert is sent in case of over speeding.

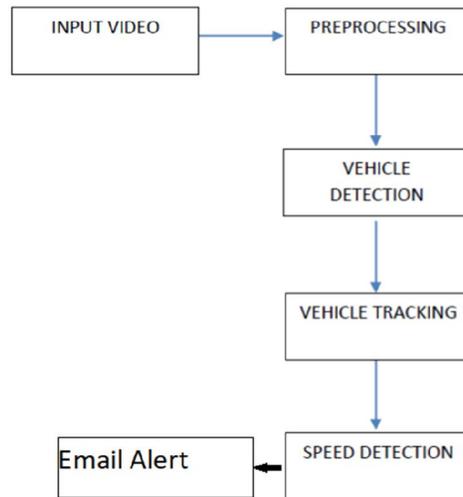
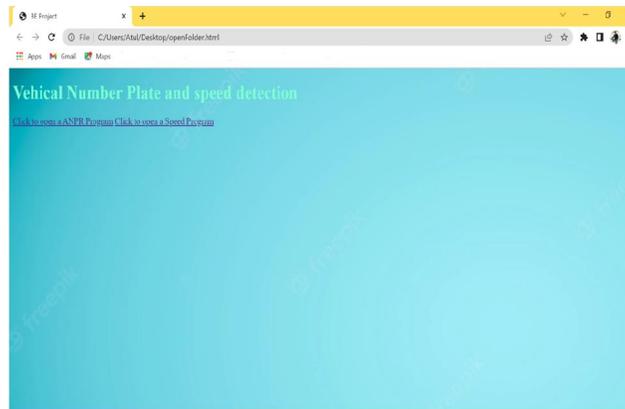


Fig. 1: Block diagram of vehicle speed detection system

V. USER INTERFACE



This is the HTML interface to open both the programs. This links is Google COLAB links to the given program.

VI. CONCLUSION

Our work will benefit the Intelligent Traffic System. It will provide them better and efficient way to analyse traffic. Time taken for data retrieval from the stored data is reduced. In case of videos now only images can be stored and we can analyse through images. Information in videos can be converted to text files, which in turn minimizes storage space. Digital speed detection can help to reduce overspeed violations, which is the main cause for accidents.

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To develop A Machine Learning Methodology for detection of vehicle number plate and speed and send an email alert in case of over speeding.

REFERENCES

- [1] O. Smirg, Z. Smekal, M. K. Dutta, and B. Kakani, "Automatic detection of the direction and speed of moving objects in the video," in 2013 Sixth International Conference on Contemporary Computing (IC3), pp. 86–90, Aug 2013.
- [2] J. x. Wang, "Research of vehicle speed detection algorithm in video surveillance," in 2016 International Conference on Audio, Language and Image Processing (ICALIP), pp. 349 - 352, July 2016.
- [3] C. Pornpanomchai and K. Kongkittisan, "Vehicle speed detection system," in 2009 IEEE International Conference on Signal and Image Processing Applications, pp. 135–139, Nov 2009.
- [4] M. A. Alavianmehr, A. Zahmatkesh, and A. Sodagaran, "A new vehicle detect method based on gaussian mixture model along with estimate moment velocity using optical flow,"
- [5] I. Iszaidy, A. Alias, R. Ngadiran, R. B. Ahmad, M. I. Jais, and D. Shuhaizar, "Video size comparison for embedded vehicle speed detection travel time estimation system by using raspberry pi," in 2016 International Conference on Robotics, Automation and Sciences (ICORAS), pp. 1–4, Nov 2016
- [6] K. V. K. Kumar, P. Chandrakant, S. Kumar, and K. J. Kushal, "Vehicle speed detection using corner detection," in Proceedings of the 2014 Fifth International Conference on Signal and Image Processing, ICSIP '14, (Washington, DC, USA), pp. 253–258, IEEE Computer Society, 2014.
- [7] H.-Y. Lin, K.-J. Li, and C.-H. Chang, "Vehicle speed detection from a single motion blurred image," *Image and Vision Computing*, vol. 26, no. 10, pp. 1327–1337, 2008.
- [8] C. Stauffer and W. E. L. Grimson, "Adaptive background mixture models for real-time tracking," in *Computer Vision and Pattern Recognition, 1999. IEEE Computer Society Conference on*. vol. 2, pp. 246–252, IEEE, 1999.
- [9] A. Burton and J. Radford, *Thinking in perspective: critical essays in the study of thought processes*. Methuen, 1978.
- [10] D. H. Warren and E. R. Strelow, *Electronic Spatial Sensing for the Blind: Contributions from Perception, Rehabilitation, and Computer Vision*, vol. 99. Springer Science & Business Media, 2013.