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APPLICATION OF DYNAMIC IMAGE PROCESSING TECHNIQUES AND GENETIC ALGORITHMS IN VEHICLES NUMBER IDENTIFICATION

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ABSTRACT

In This Research, the Design of an algorithm for vehicle number plate identification by recognizing we design a new genetic algorithm (GA). it is introduced to detect the locations of license plate (LP) symbols in a vehicle. An adaptive threshold method is apply to overcome the dynamic changes of illumination, when it is converting the simple image into binary image. Basically, A Connected component analysis technique (CCAT) is used for detecting the candidate objects Which is inside to the unknown image. A scale-invariant geometric relationship matrix is introduced to model the layout of symbols in any type of LP that simplifies system adaptability when applied in different countries. Moreover, two new crossover operators are based on sorting and introduced, which greatly improve the convergence speed of the system. Colour (RGB) to gray-scale (GS) conversion is performed using the Filtering technique by eliminating the hue and saturation information while retaining the luminance Maximum of the CCAT problems, such as touching or broken bodies Edge-based techniques were also being implemented to detect the plate which is based on the high density of vertical edges Detecting license text and at the same time it is distinguishing from similar patterns based on the geometrical relationship between the constituting symbols the license numbers is the mainly selected approach in this research. Encouraging the results with 98.4% overall accuracy have been reported for two different data-sets and its having a variability in orientation, scaling, plate location, illumination and complex background. Some Examples of distorted plate images were successfully detected due to the in-dependency on the shape, colour, or location of the plate.

Keywords - Genetic algorithms, image processing, image representations, license plate detection, machine vision, road vehicle identification, sorting crossover.

I. INTRODUCTION

The detection of the License Plate (LP) stage is the most critical step in an automatic vehicle identification system. Mostly research has been carried out to overcome many problems faced in this area but there is no general method to Solve overcomes problem and that can be used for detecting license plates in different places or countries, because of the difference in plate style or design. GA has been used rarely because of their high computational needs.

Different researches have tried at different levels under some constraints to minimize the search space of Gas [1]. Researchers in [2] based on their GA on pixel color features to segment the image depending on stable colors into plate and non-plate regions, followed by shape dependent upon the rules to identify the plate's area. Success rate of 92.8% was recorded for 70 test-samples. In [3], GA was used to search for the best fixed rectangular area having the same texture features as that of the prototype template. The used techniques are lacks invariability to scaling because fixed parameters have been used for the size of the plate's area. Genetic Algorithm (GA) was used to locate the plate vertically after detecting the left and right limits of plate based on horizontal symmetry of the vertical texture histogram around the number plate's area. Edge-based techniques were also implemented to detect the plate based on the high density of vertical edges inside it [4] [5] [6].

The drawback of this method is that its sensitivity to the presence of model identification text or other objects which is above or below the vehicle which can disturb the texture histogram. Genetic Algorithm (GA) was used to recognize the License Plate (LP) symbols not to detect the License Plate (LP). Mostly group of researchers tried to manipulate the complete problem from the texture perspective to differentiate between texture and other image types. The main drawback of segmentation techniques was their intensive computational demand and also sensitivity to the presence of other text such as it can be bumper, stickers or model identification.

Detecting license text and at the same time distinguishing it from similar a pattern which is based on the geometrical relationship between the symbols constituting the license numbers is the mainly selected approach inside to this research. Consequently, a new technique is introduced in this paper which detects symbols of LP without using any information associated with the plate's outer shape or internal colors to allow the detection of the license numbers in case of shape or color distortion either physically or due to capturing problems such as poor lighting, shadows and camera position and orientation. To search for the candidate objects and also to allow tolerance in the localization process, a new genetic algorithm has been designed with a new reliable fitness function. Image processing is done out at first to prepare for the GA phase.

1.1. Objective

The purpose of this document is to present a detailed description of the product rating & Review Summarization. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react on (LP).

1.2 Problem Statement

In this Proposed System, the design of Image processing with new genetic algorithm (GA) is introduced to detect the locations of license plate (LP) symbols. A latest technique is introduced in this paper that detects LP symbols without using any kind of information associated with the plate's outer shape and also internal colors. The proposed system is composed of two phases: image processing and GA phase.

1.3 Motivation

Distorted of plate images are successfully detected due to the independence on the shape, color, or location of the plate. Detect LP of different places and countries. Detecting license text and at the same time distinguishing it from similar patterns

II. LITERATURE SURVEY

We have been gathering information about the image processing and genetic algorithm techniques available and how does they work. The phenomenon is that they have come across consists in special challenges associated with image processing reviews and studying genetic algorithms which make it very challenging task to its recognize and to remove defected images. In this future work is to combining some of these feature selections, image processing, applying algorithm to misspelled number plate and also applying different processing techniques.

G. E. Liepins and M. R. Hilliard defines Genetic algorithm. Attention is directed to why they work: sachems and building blocks, implicit parallelism, and exponentially baized on sampling of the better schema. Why they fail.? and how undesirable behavior can be overcome is discussed. Current GA practice is summarized. Five successful applications are illustrated: image registration, AEGIS surveillance, network system configuration, prisoner's dilemma, and gas pipeline control. Three classes of problems for which genetic algorithms are mostly ill suited are illustrated: ordering problems, smooth optimization problems, and "totally incomparable" problems.

W. Lenders, and C. Baier is discovered ordered binary decision diagrams (BDDs) yield a data structure for switching functions that had been proved to be very useful in many areas of computer science. The major problem with BDD-based calculations is that variable ordering problem which addresses the question of finding an ordering of the input variables which min the size of the BDD-representation. In this paper, we discuss the use of genetic algorithms to improve the variable ordering of a BDD. Firstly, we explain the main features of an implementation and report on experimental studies. In this, we present a new crossover technique that turned out to be very useful in combination with sifting as hybridization tech. Second, we provide a definition of a distance graph which can serve as formal framework for most efficient schemes for the fitness evaluation.

2.1 Existing System

Bernstein algorithm was combined with the Gaussian filter to used as the existing algorithm, for shadow removal method. The Existing algorithm is concerned with the LP of one specific country. An algorithm for license plate recognition (LPR) applied to intelligent transportation system is proposed on the basis of a novel shadow removal technique which is used by character recognition algorithms. The Existing License plate extraction based on vertical edge detection and mathematical morphology.

Disadvantages:

- License plates of one specific country only
- To make license plate numbers more legible
- The problem from the texture perspective to differentiate between text and other image types

2.2 Proposed System

In this Proposed System, the design of a latest genetic algorithm (GA) is introduced to detect the locations of license plate (LP) symbols. A latest technique is introduced in this paper that detects LP symbols without using any information associated with the plate's outer shape and internal colors. The proposed system is composed of two phases: image processing phase and GA phase. The new genetic-based prototype system for localizing 2-D

compound objects inside plane images was introduced and detected in the localization of LP symbols. In Proposed System, we can implement the Car License plate through image.

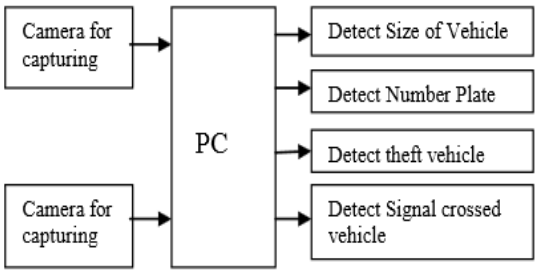
Advantages:

- Distorted plate images are successfully detected due to the independency on the shape, color, or location of the plate.
- Detect different places and countries
- Detecting license text and at the same time distinguishing it from similar patterns

III. OVERALL SYSTEM WORK FLOW

In this section, an overall of the system working is introduced. The proposed system is composed of two phases: image processing phase and GA phase. Each phase is consisting of many stages. The flowchart in Fig.3.2 depicts the various image processing stages that produce image objects to the GA phase. GA selects the optimum LP symbol locations depending on the input GRM that defines the relationships between the symbols and concerned LP.

3.1 Image Processing



In Above fig structure of NPR are showed that the whole development of Vehicle License Plate (LP) Detection Throw a Two Cameras. The developed system has followed Dynamic Programming strategy throughout its implementation. In mathematics and computer engineering, an algorithm is a step-by-step procedure for calculations. Algorithms are used for calculation data processing, and automated reasoning. An algorithm is simply a set of rules used by a computer to solve a particular problem. A good algorithm design is the crucial part of software development. It is believed that a real world performance of any software largely depends upon the algorithm used in designing the software.

3.2 Overall System Diagram

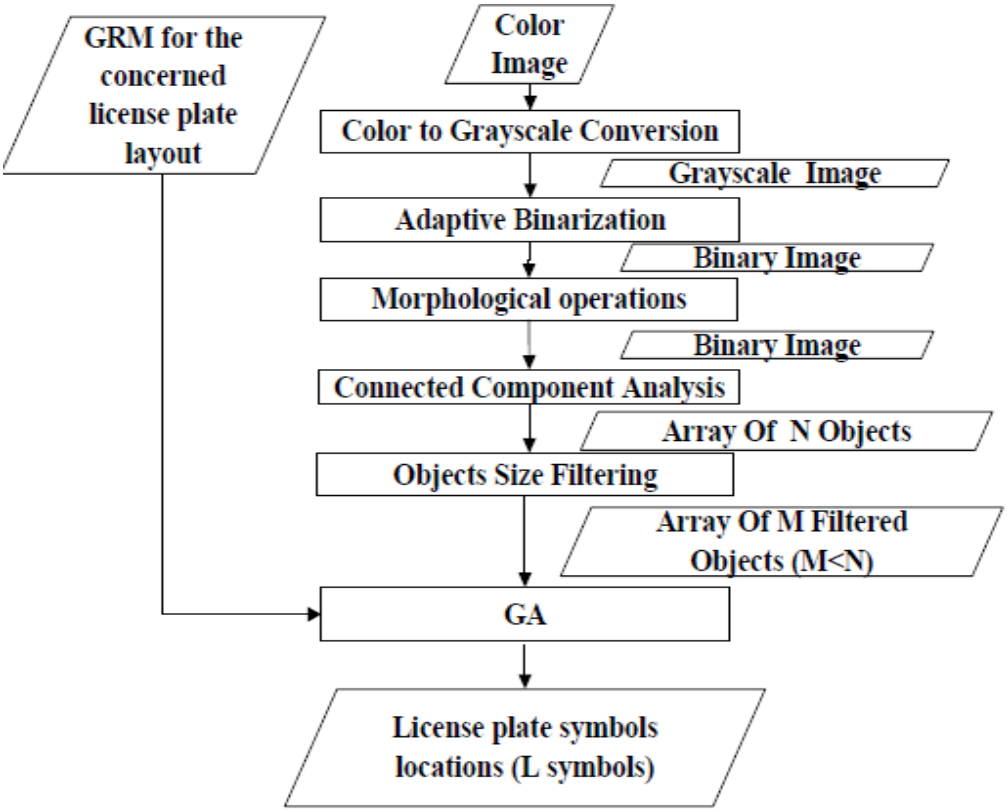


Fig.3.2 System work flow

When user logins from home page, he will get switched to the page where product categories and its details are shown. From this place user need to select image. It will show as an original image. Then click on start processing for next phases. Next phase will generate into Gray scale image using color to grayscale algorithm. As shown in first phase. Then in next phase Grayscale image is converted into binary image using adaptive binarization technique. Later Morphological operation is performed on binary image to detect a number plate in image. As shown in about fig. 7.1.2 System module. The standard format of (LP) is recognize from number plate and stored in an array of N object using connected component analysis. After component analysis filtration process is obtain on array of object. Though GA is applied on (LP) to get desired output.

IV. ALGORITHM

Pseudo-Code Of The GA Used For The Proposed Algorithm

- **GA** (Fitness, Fitness_threshold, p, r, m)

Fitness: Evaluation function that assigns an evaluation score, given a candidate region.

Fitness_threshold: A threshold specifying the termination criterion.

p: Number of generated candidate regions at each iteration.

r: The fraction of the population to be replaced by Crossover at each step.

m: The mutation rate.

- **Initialize population:** p- Generate p candidate regions at random.
- **Evaluate:** For each h in p, compute Fitness(ci)'
- While [max, Fitness(c)] < Fitness _ threshold do

  Create a new generation, Ps:

1. **Select:** Probabilistically select (1 – r) members of P to add to Ps. The probability PR(hi) of selecting chromosome ci from p is given by,

$$Pr(ci)=Fitness(ci)/E^{pj-1}Fitness(cj)$$

2. **Crossover:** Probabilistically select r-p/2 pairs of candidate regions from p, according top(ci) given above. for each pair,(C1-C2), produce two offspring by applying the Crossover operator.

Add all offspring to Ps.

3. **Mutate:** Choose m percent of the members of Ps with uniform probability. For each, invert one randomly selected bit in its representation.

4. **Update:** P←Ps.

5. **Evaluate:** for each h in P, compute Fitness (ci) Return The candidate region from p that has the highest Fitness.

The proposed fitness is selected as the inverse of the calculated objective distance between the prototype chromosome and the current chromosome. Before clarifying how the objective distance is measured, we will show first how the geometric relationships between the objects inside a compound object are represented, followed by a discussion of parameter adaption in case of various LP detection layouts.

V. IMPLEMENTED MODULE

5.1User Module.

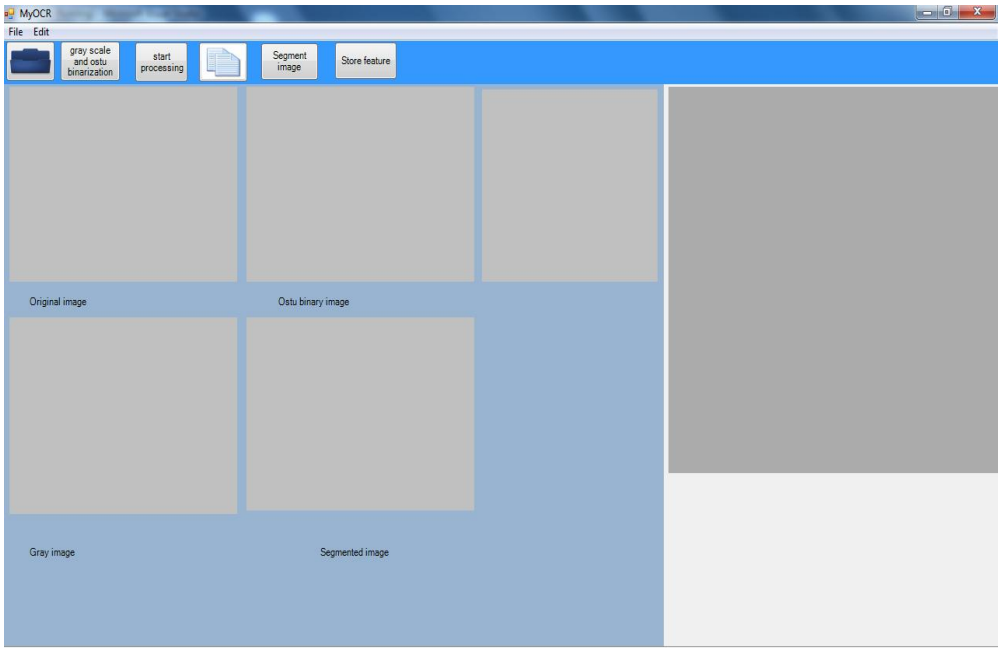


Fig.5.1.1 Main Phase

When user logins from home page, he will get switched to the page where product categories and its details are shown. From this place user need to select image. It will show as an original image. Then click on start processing for next phases. Next phase will generate into Gray scale image using color to grayscale algorithm. As shown in first phase.

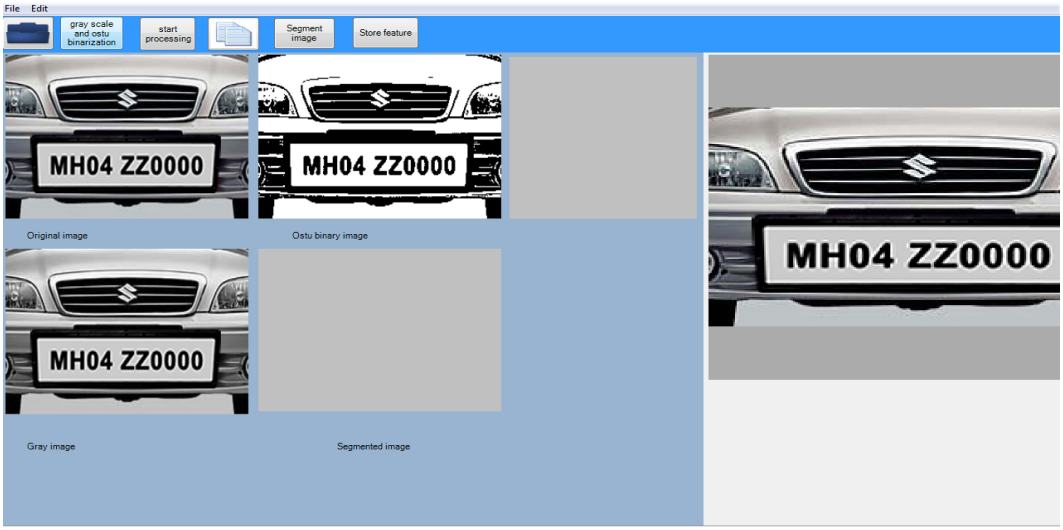


Fig.5.1.2 First Phase

5.2 System Module

Fig.5.2.1 System Module

Then in next phase Grayscale image is converted into binary image using adaptive binarization technique. Later Morphological operation is performed on binary image to detect a number plate in image. As shown in about fig. 5.1.2 System module. The standard format of (LP) is recognize from number plate and stored in an array of N object using connected component analysis. After component analysis filtration process is obtain on array of object. Though GA is applied on (LP) to get desired output.

VI. CONCLUSION

The Main Part of This Proposed system is we using a Genetic Algorithm (GA). The License Plate (LP) which may contain unwanted information on a plate. These may firstly remove by the image processing phase and then localized by the genetic algorithm phase. The results were easily encouraging and a new approach for solving the LP detection problem based only on the geometrical layout of the LP symbols. Also, a flexible system was introduced that can be simply charactarised for any LP layout by constructing its GRM matrix. This system possessed high immunity to changes in illumination either temporarily or spatially to a high percentage success rate was achieved with the aid of the adaptability aspect of the GAs. A very important attainment or problems is overcoming most of the problems arising in techniques based on CCAT by allowing the GA. Also, an enhancement in the performance of the developed GA was achieved by applying the new USPS crossover operators, which vary greatly improved the convergence rate of the whole system.

VII. ACKNOWLEDGMENT

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REFERENCES

[1] Aditya S. Pandit [1], Parishma S. Gaikwad[2], Yogita S. Bhamare[3], Sharique Malik[4], H.D. Sonawane[5],” Application of Dynamic Image Processing Techniques and Genetic Algorithms in Vehicles Number Identification”, at IRJET volume: 2 issue: 6 / September 2015(ISSN: 2395-0056 2395-0072).

[2] S. K. Kim , D. W. Kim and H. J. Kim "A Recognition of Vehicle License Plate Using a Genetic Algorithm Based segmentation," Proc. Int. Conf. Image Process., vol. 1, pp. 661-664, 1996.

[3] J. Xiong, S. Du, D. Gao and Q. Shen, "Locating Car License Plate Under Various Illumination Conditions Using Genetic Algorithm," Proc. ICSP, vol.3, pp. 2502 -2505, 2004. [4] W. Wang, Q. Jiang, X. Zhou, and W. Wan, ”Car License Plate Detection Based on MSER,” In Proc. International Conference on Consumer Electronics, Communications and Networks, pp. 3973- 3976, 2011.

[4] H. W. Lim and Y. H. Tay, “Detection of License Plate Characters in Natural Scene with MSER and SIFT Unigram Classifier,” In Proc. IEEE Conference on Sustainable Utilization and Development in Engineering and Technology, pp. 95-98, 2010.

[5] H. Anoual, S. Fkihi, A. Jilbab, and D. Aboutajdine, “Vehicle License Plate Detection in Images,” International Conference on Multimedia Computing and Systems, pp. 1-5, 2011.

[6] X., Zhang, and S. Zhang, “A Robust License Plate Detection Algorithm Based on Multi-Features,” International Conference on Computer and Automation Engineering, vol. 5, pp. 598-602, 2010.