

Detection and Recognition of Car Number Plate for Automatic Fare Collection Application

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ABSTRACT

Automatic Number Plate Recognition and detection is an image-processing technology. Automatic number plate recognition and detection consists of 4 phases: - Image processing, number plate localization, optical character recognition, development of fare collection application. This paper presents a recognition and detection method in which the car plate image is obtained by the digital cameras and the image is processed to get the number plate information. A image of a car is captured and processed using various algorithm. This system consists of many algorithms. My study mainly focusing on the one fast algorithms i.e. PSO for the localization of number plate.

Keyword

Number plate recognition, number plate detection, number plate localization, Image processing.

1. INTRODUCTION

Number plate detection and Recognition can be applied in vehicle management, such as security control, traffic monitoring, automatic vehicle ticketing, and so on. For number plate detection and recognition some system require video capture hardware, possibly combined with infrared strobe lights (PVW), or require that the images be taken with little distortion from view point changes. Generally, a number plate detection and recognition system has solved two problem: Where number plate located and how big it is. There are many challenges in number plate detection and recognition in an open environment, such as various observation angles from camera, background clutter, differently sized number plate, poor image quality from uneven lighting condition, and multi-plate detection and recognition. The main method can adaptively deal with various changes in the number plate such as rotation, scaling, illumination, etc. Promising result of the proposed approach is demonstrated with an experimental study in number plate detection and recognition.

In this project we are using PSO (particle swarm optimization). This techniques is to localized the number plate. The system is implemented using MATLAB and various image samples are taken by a camera. A basic of PSO algorithms works by having a population called swarm of candidate solutions called particles. The movements of particle is vary according to its best position and this is works dimension by

dimension. PSO algorithm is simple and easy to implement. The algorithm keeps track of two global variables:

- Condition or target.
- Global best (gbest) value indicating which particles data is currently closests to the target.

The PSO model is introduced to represent the relationship among the number plate characters. Finally, number plate locations are obtained with PSO inference. Dependencies of characters are modelled in probability distribution with PSO. The global optimal solution can be reached with local observations. PSO selects the optimum Number plate symbol depending on the input geometric relationship matrix (GRM) that defines the geometrical relationships between the symbol in the number plate. Unlike in genetic algorithms, evolutionary programming and evolutionary strategies, in PSO, there is no selection operation. Even if sometimes, not all the characters are successfully extracted in Number plates sometimes, a correct inference result can be also obtained with the existing contextual information. The main contribution is to design automatic car number plate detection application and apply PSO to Number plate recognition. In addition, it is one specific PSO model for modeling characters in Number plate.

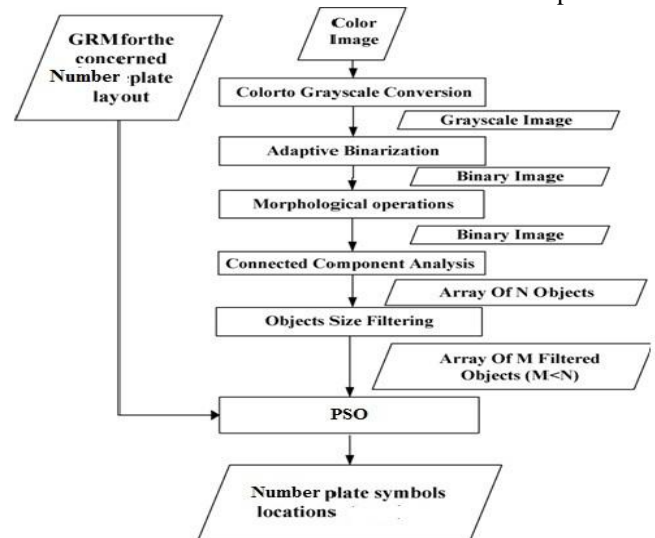


Fig1-Overall system flow chart for number plate localization

2. REASEARCH WORK

The proposed system for the detection and recognition of number plate is as shown in below figure2.

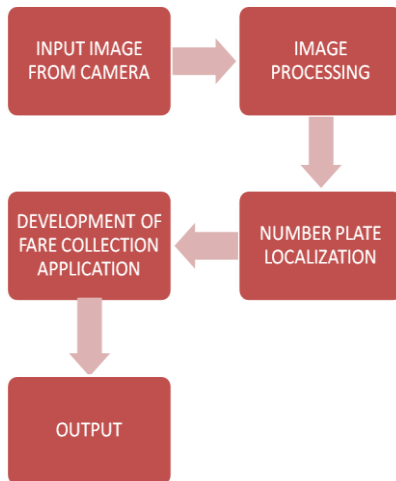


Fig2- General proposed system

In previous system we are using genetic algorithm for localization of number plate but this system takes a lots of time for processing the small image. To remove this drawbacks and maintained the good accuracy level we are developing a PSO algorithm. The pattern of number plate is very high variations. If the number plate is very similar and its background is also similar it's difficult to identify the location. Brightness and contrast is changes as light fall changes to it. In this paper the morphological operations are used to extract the contrast feature within the plate. The work is divided into several parts:

- A. Input image
- B. Image processing
- C. PSO algorithm
- D. Number plate recognition
- E. Fare collection application

A] Input Image:-

Input the image that is taken from the car figure3.



Fig3 -Input image of car

B] Image Processing:-

Image processing is a method to perform some operation on an image, in order to get an enhanced image .It is a type of signal processing in which input is an image and output may be image or character. In new generation image processing play important role. There are two types of methods used for image processing namely, analog and digital image processing .Analog image processing use for the hard copies like photographs. And digital image processing are use for the digital image by using computer. Image processing operation is performing in following way.



Fig4:- Image processing steps.

C] PSO Algorithm:-

PSO stand for particle swarm optimization .This algorithm are use to localized the image of number plate. This algorithm is easy to developed and understand. PSO selects the optimum NP symbol depending on the input geometric relationship matrix (GRM) that defines the geometrical relationships between the symbols in the concerned NP.To search for the candidate objects and to allow for tolerance in the localization process, a PSO algorithm has been

designed. PSO is a robust stochastic optimization technique based on the movement and intelligence of swarms. PSO applies the concept of social interaction to problem solving. Figure below shows the concept of searching point by PSO.

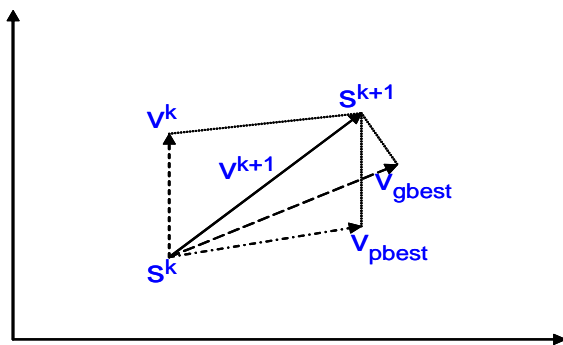


Fig5 Concept of PSO Algorithm

D] Number Plate Recognition

In number plate recognition system signal is sent to the camera which captures the image. The video are taken from 4 to 5 meter distance and the video is saved on the system. But if the car is pass not pay the fare then alarm buzz. In this system also gives the information of the car number plate and note the IN time and OUT time of the car .In this system character recognition are done by template matching and optical character recognition are use for the character matching. Firstly, the sample is classified and then the recognized characters are normalized by the template size in the character database. It will match with all templates and calculate their similarity. Each data segment corresponding to each character is match. Finally the best match will be chosen as the result. Figure below shows the OCR system.

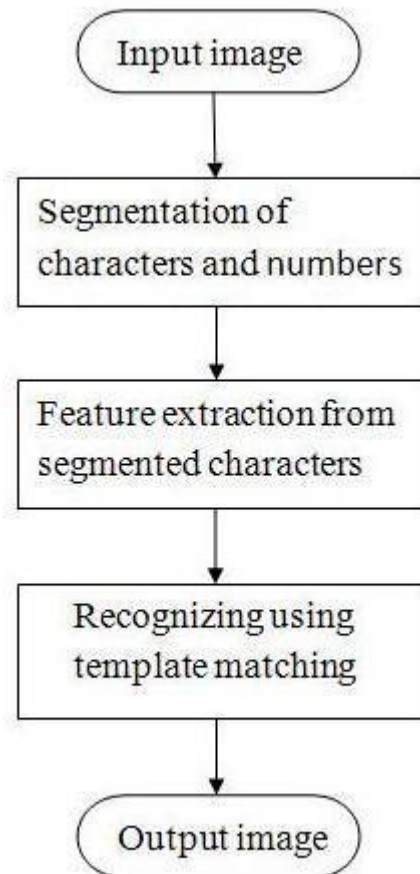


Fig6:-Flow chart of the OCR process

E] Fare Collection Application:-

This application is developed for the collection of fare. In this application Firstly, IN time of the car is taken and this time is automatically note on the computer screen. After that OUT time is also note and according to that fare will be calculated.

3. PREVIOUS WORK DONE

Various methods have been developed for the detection and recognition of number plates. Some of the related works in the field of automatic car plate recognition and detection are as follows.

In [1] Z.C. Zhang and Y.Y. Tang first takes the input image into a grayscale, then erosion and dilation morphological operations. The plate is extracted with use of vertical and horizontal projection among various candidates.

In [2] Sourav Roy present an approach based on simple and efficient morphological operation and Sobel edge detection method to locate the number plate. Based on the above mentioned method, many numbers license plate localization and recognition algorithms have been developed. In this paper, an improved and efficient approach is identified with high detection rate based on morphological edge detection and template matching.

In [3] give the information related to the particle swarm

optimization. This algorithm is used for the localization of the number plate.

In [4] Huili Han, Runping Han present an approach based on the edge detection of the image and this paper also gives the information about the colour of the image.

In [5] J. B. Kim described the clusters of connected components are searched by simple techniques, such as morphology and projection. It is noted that a similar character detection algorithm is also applied.

In [6] W. Wang present an approach based on MSER and detected the image based on the MSER.

In [7] A. E. Zadeh, A. Khazaei present an approach based on the classification of the Electrocardiogram Beats by using the PSO.

In [8] M. Ibrahim and M. Shehata present an approach based on the recognition of license plate. In this license plate is automatically recognition and give the correct information of the license plate.

In [9] M. R. Bai, V.V. Krishna, and J. Sreedevi present an approach based on removal of noise and edge detection. Also in this paper we are using morphological image processing for the processing of the image.

In [10] Sarbjit Kaur present an approach based on an efficient approach for number plate extraction. In this paper the proposed method is mainly designed for real-time Indian vehicles number plate but it also works well for foreign number plates.

In [11] C.-N. E. Anagnostopoulos describe that the large amount of license plate detection and the plate recognition from still images and video sequence methods can be roughly divided into three categories, namely, edge-based methods, texture-based methods, and color-based methods.

In [12] Y. Wen, Y. Lu, J. Yan, and P. Shi, described an alternative method for license plates without frames is presented. Texture-based methods mainly focus on the macroscopic distribution of pixel intensity in plate regions.

4. CONCLUSION

This paper presents recognition and detection method in which the car plate image is obtained by the digital cameras and the image is processed to get the number plate information. An image of a car is captured and processed using PSO algorithms. This algorithm gives the better performance than genetic algorithm.

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