DETECTION OF LICENSE PLATE AND MAKE-MODEL OF VEHICLE USING SURF ALGORITHM

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ABSTRACT

This work is a detection of license plate and make-model of vehicle using SURF (Speeded Up Robust Features) algorithm. This SURF feature used to capture the front or rear view of the vehicle to highlights the dominant feature. Here we use two dictionary scheme that are single dictionary and modular dictionary for classification purpose. The SVM (Support Vector Machine) classifier is used to increasing the processing speed and accuracy. Generally VMMR (Vehicle Make Model Recognition) is used to find the theft vehicles and also used in highly vulnerable area such as parking vehicles in airport, malls, railway station, stadium etc. We planning to eliminate the ambiguous problem such as identifying between "o" or "0". Here we use SURF features along with SIFT (Scale Invariant Feature Transform) algorithm to describe instances of make model of vehicle. In spite of using various algorithm the problem of multiplicity and ambiguity can be resolved by representing and discriminating the global feature. Finally we predict the make model number and detection of license plate.

Keyword : - *Global feature, SURF feature, SVM classifier...*

INTRODUCTION

This project uses the Bag of Speeded Up Robust Feature for representing the front or rear view of the vehicle which is captured by 2D cameras. In traditional method, the plate observed manually by a human was a time consuming and it is difficult to recollect the license plate number. The license plate has following limitations such as forged, damaged, modified, depicted. It can be prevented by VMMR technique from detection and identification of vehicle. In some cases, it is not necessary to display the front view and back view of the vehicle hence it is difficult to detect the license plates. License plate recognition is one of the image processing technology which is used to identify the vehicles by their license plate. It is a software application which is implemented in MATLAB tool. License plate image is converted into computer based data which can be crosschecked with the database. It can capture the image in both fast and slow moving traffic. In large vehicle moving areas the cameras are select with the megapixel image sensor. It performs both day and night operations with high contrast images. It has four major function such as collecting the images, analyzing the images, data storage and data transmission. Camera captures the whole image of the car, find the location of numbers and extract the character by using character recognition tool and it is converted into pixels. In previous method it usage edge detection and hough transform makes the system more expensive and artificial neural network requires large training data. In order to capture the fast moving vehicles it requires a special technique to avoid blur image. Some images are high power illumination which cannot be detectable by human eye. Only AHR's ANPR cameras can meet these requirement which provide flexible shutter control with built in IR flash and it captures the running images up to 250km/hr. This camera increases the flexibility and efficiency. This capable of reading the number plate of any vehicle with high accuracy within fraction of seconds. Each vehicle has unique

license plate number and make-model number by using this unique number implemented in variety of applications such as monitoring the border, management of toll, management of parking etc. The vehicle detection first must be able to detect the Region of Interest (ROI) of vehicle to get information about the vehicle. SURF (Speed up Robust Features) is used to detect the all possible matching pair for analyzing and detection of vehicle. The background subtraction method is not required in detection of the vehicle. The VMMR is used o recognize each type of vehicle. The VMMR is a multiclass classification and has challenges like multiplicity, inter and intra models which should be resolved to achieve the highly robust VMMR. Our approaches provides highly accurate VMMR system for the real time application.Our method uses SIFT (Scale Invariant Feature Transform) along with SURF algorithm to solve the complexity and slow computation of the system. Thus SVM classifier is used to predict the make model number.

2. RELATED WORKS

2.1 Preprocessing

In preprocessing the car image is taken and it selects the region of interest to find the car make-model. The detected part is given to the Speedup robust features to detect the vehicle. Here the RGB is converted into grayscale image since the RGB has large range. It performs noise filtering and histogram equalization. In noise filtering it removes the unwanted details of image. Histogram equalization is used to reflect the characteristics of an image. Here the edge detection method is done to find the make-model.

2.2 Feature extraction.

Feature extraction is used extract the dominant features in the vehicle. It extracts the features for classification purposes. Feature extraction increases the recognition performance of the system. Due to combination of SURF features along with SIFT it increases the accuracy and speed than other descriptors. The ROI region is extracted from the input image. It extracts the raw data information which is suitable for classification. It extracts the license plate image from the front view or back view. It hides the background region and extracts only the license plate.

2.3 Classification

The BOSURF representation is used to view the local image features like SURF. Here the matching process is performed using the Support Vector Machine (SVM) classifier to predict the vehicle model. The multiplicity problem and ambiguity problem is resolved by global feature representation. Image classification is based on the labelling of pixels or group of pixels based on its gray value.

3.PROPOSED METHOD

The block diagram shows the flow of process done to predict the make model. The image of the car is sent as an input where the preprocessing of the image is the image is converted into grayscale level and performs the edge detection to predict the model of the car.instead of taking the whole image it focuses on the region of interest

3.1 Vehicle detection

The aim of vehicle detection is to find the region of interest of the input image. It filters out the background region and obtain only the dominant feature such as license plate. The MMR which increases the efficiency. Image segmentation and edge detection is used to view the vehicle of interest. Some morphological process is also used for classification process. The classification is done based on size, color, or shape of the vehicle. It is an real time based application. Here it gathers the information about the surrounded region. The speedup robust features is used for many visual based applications. The multiplicity problems occurs when one vehicle having different models. In order to overcome these multiplicity and ambiguity problems SURF descriptors is adopted.

3.2 Global feature representation

In order to describe the vehicle make-model it extracts various local features from the region of interest (feature extraction process occurs). As SIFT has high dimensionality and slow computational speed it combines with SURF algorithm to increase the performance and efficiency. The global feature representation it depends on the processing speed and VMMR accuracy. It uses Square Mapped Gradients as global vectors. Shape classification plays an important role in processing of image and to recognize and understand the physical structures. SIFT is used for generic visual.

3.3 Classification

Generally, VMMR is based on local features and global feature representation of make-model. The SIFT is used for the matching purpose as it is time consuming not suitable for real time application we add the SURF features into it. The SVM (Support Vector Machine) classifier is used for classification purposes. It uses two SVM based classification schemes to solve the VMMR issues. The classification approach is based on sparse representation and Hamming Distance. The Bag of speeded up Robust Features is used represent the image into global representation. The feature representation requires region of interest, and modular dictionary schemes.
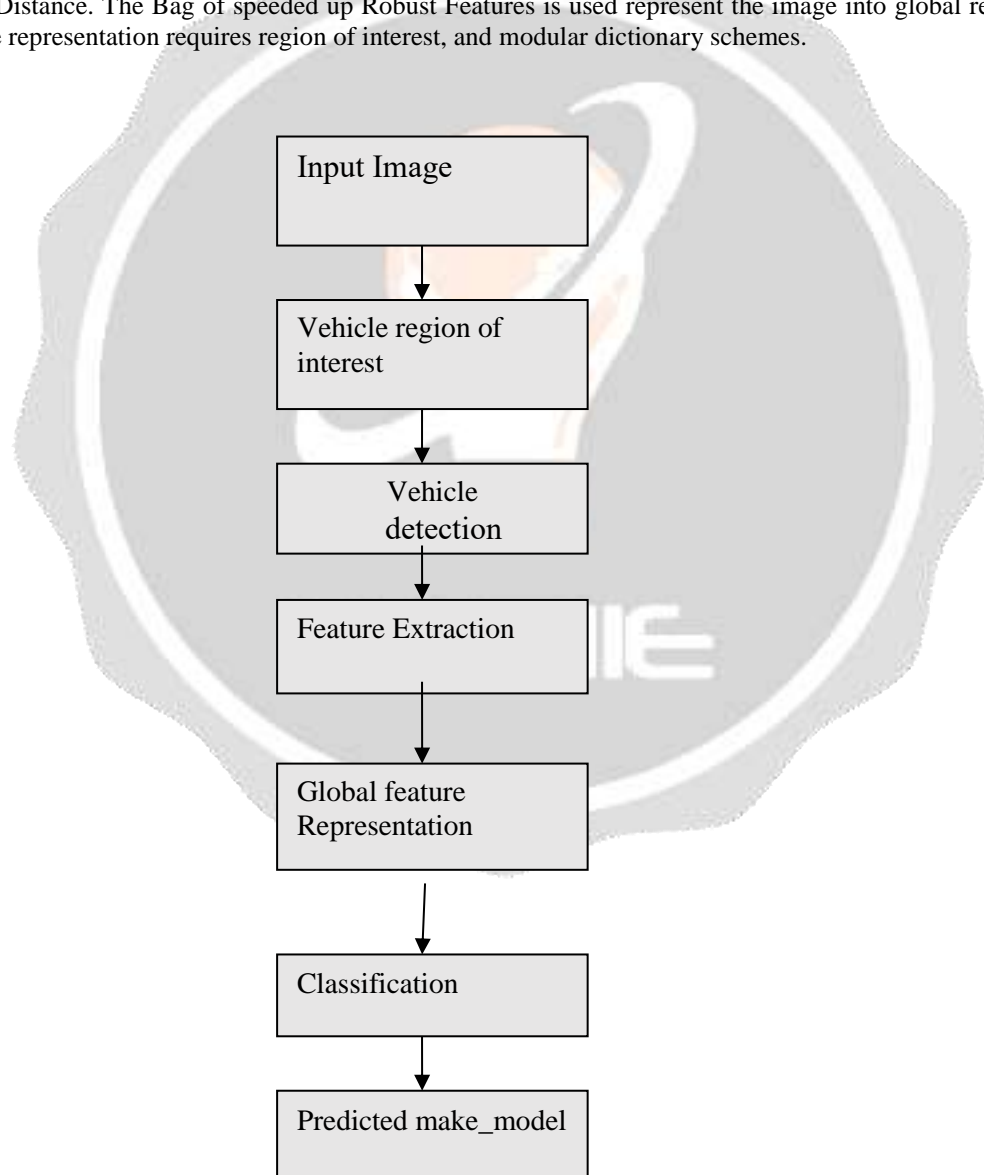

Fig 1 block diagram of MMR

4. RESULTS

Fig 2 Input of the car image

Fig 3 Region of interest is detected from the vehicle

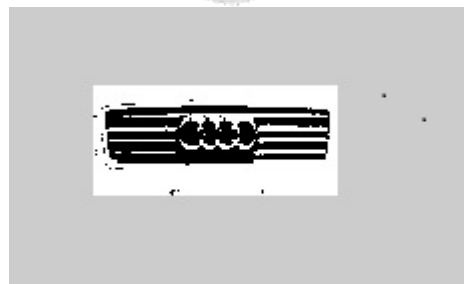**Fig 4 Converting RGB to grayscale value**

Fig 5 Edge detection

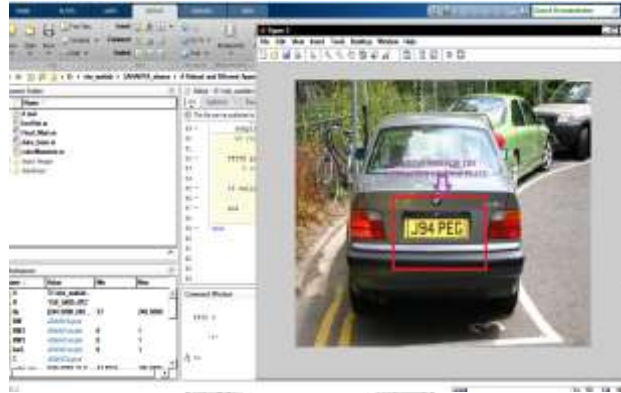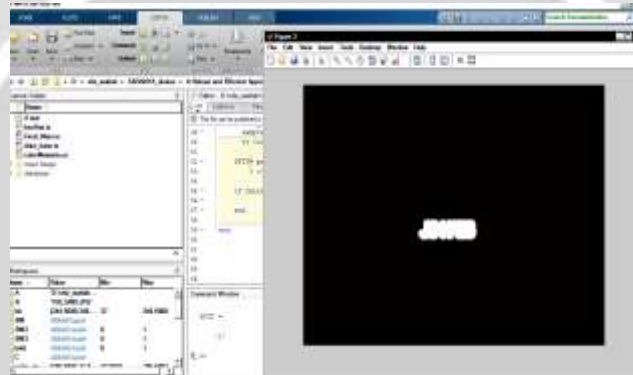**Fig 6 Extraction of license plate from the vehicle**
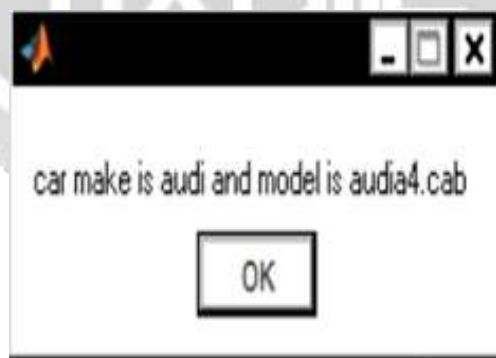

Fig 7 Detection of license plate

Fig 8 The predicted car model and make-model number

of the vehicle

5. CONCLUSIONS

This paper describes about the detection of license plate and make-model of the vehicle using the SURF features which resolves the problem of multiplicity and ambiguity.The SVM classifier is used for the classification process.The SURF increases the processing speed and reduce multiplicity issues.

6. REFERENCES

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