An Analysis on Road Traffic Accidents Prevention Mechanism Using Supervised Learning

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Abstract: Advanced driver assistants (ADAS) play an important role in reducing traffic accidents. Traffic accidents are especially intense for a rainy day, Night, rainy season, rainy season, ice and day without street lighting many low-level conditions. Current View Drive the help systems are designed to be done under good-nature Weather. Classification is a method of identifying Optical characteristics of vision expansion protocols more efficient. Improve computer vision in awkward manner Weather environments, multi-class weather classification system many weather features and supervision were made Learning. First, basic visual features are extracted Multiple traffic pictures, then the feature is revealed .The team has eight dimensions. Secondly, five supervision was made Learning methods are used to train instructors. Analysis the extracted features indicate that the image describes accurately the highest recognition of etymology and classmates is the accuracy rate and adaptive skills. Provides the basis for the proposed method anterior vehicle innovation increases invention Night light changes, as well as increases View of driving field on an ice day. Image feature extraction is the most important process in pattern recognition and it is the most efficient way to simplify high-dimensional image data. Because it is hard to obtain some information from the M × N × 3 dimensional image matrix. Therefore, owing to perceive multi-traffic scene, the key information must be extracted from the image.

Keywords: Classification, Supervised Learning, Image Extraction.

I. INTRODUCTION

In all countries of the world, the important information about the road limitation and condition is presented to drivers as visual signals, such as traffic signs and traffic lanes. Traffic signs are an important part of road infrastructure to provide information about the current state of the road, restrictions, prohibitions, warnings, and other helpful information for navigation [1,2]. This information is encoded in the traffic signs visual traits: Shape, color and pictogram [1]. Disregarding or failing to notice these traffic signs may directly or indirectly contribute to a traffic accident. However, in adverse traffic conditions, the driver may accidentally or deliberately not notice traffic signs [3]. In these circumstances, if there is an automatic detection and recognition system for traffic signs, it can compensate for a driver's possible inattention, decreasing a driver's tiredness by helping him follow the traffic sign, and thus, making driving safer and easier. Highway traffic accidents bring mass losses to people's lives and property. Advanced driver assistants (ADAS) play an important role in reducing traffic accidents. A multi-traffic display of complex weather conditions is valuable information for help organizations. Special approaches can be used to improve visibility based on different weather conditions.

This will contribute to the expansion of ADAS. There has been little work in weather-related issues for automotive cameras so far. Classification of interior and exterior images through the margin intensity. Concentration curves to form four fog levels by a neural network. Providing a novel structure to recognize different climates. Milford and many others. Current view-based localization and mapping in altering external environments [4]. Find important changes Driving is an important task during driving Help Systems. Propose a sight-based skyline finding algorithms under picture brightness variations Fu and Al [6]. Automatic traffic data collection varies Lighting conditions. Classes to use Detecting road segment in many traffic scenes. This paper provides a comprehensive survey on traffic sign detection, tracking and classification [5]. The details of algorithms [7], methods and their specifications on detection, tracking and classification are investigated and summarized in the tables along with the corresponding key references.

II RELATED WORK

Generic Object Detection: Object detection is a challenging but important application in the computer vision community. It has achieved successful outcomes in many practical applications such as face detection and pedestrian detection [9]. Complete survey of object detection can be found in [7], [16], [22]. This section briefly reviews several generic object detection methods. One classical object detector is the detection framework of Viola and Jones which uses a sliding-window search with a cascade classifier to achieve accurate location and efficient classification. The other commonly used framework is using a linear support vector machine (SVM) classifier with histogram of oriented gradients (HOG) features, which has been applied successfully in pedestrian detection [8]. These frameworks achieve excellent detection results on rigid object classes. However, for object classes with a large intra-class variation, their detection performance falls down dramatically. In order to deal with appearance variations in object detection, a deformable parts model (DPM) based method has been proposed in [16]. This method relies on a variant of HOG features and window template matching, but explicitly models deformations using a latent SVM classifier. It has been applied successfully in many object detection applications. In addition to the DPM, visual sub categorization [10] is another common approach to improve the generalization performance [14] of detection model. It divides the entire object class into multiple subclasses such that objects with similar visual appearance are grouped together.

A sub-detector is trained for each subclass and detection results from all sub- detectors are merged to generate the final results. Recently, a new detection framework which uses aggregated channel features (ACF) and an AdaBoost classifier has been proposed in [11]. This framework uses exhaustive sliding-window search to detect objects at multi-scales [15]. It has been adapted successfully for many practical applications. Traffic Sign Detection: Many traffic sign detectors have been proposed over the last decade with newly created challenging benchmarks. Interested reader should see references which provide a detailed analysis on the recent progress in the field of traffic sign detection. Most existing traffic sign detectors are appearance-based detectors. These detectors generally fall into one of four categories, namely, color-based approaches, shape-based approaches, texture-based approaches, and hybrid approaches. Color based approaches [8], [9], usually employ a two- stage strategy.

First, segmentation is done by a thresholding operation in one specific color space. Subsequently, shape detection is implemented and is applied only to the segmented regions. Since RGB color space is very sensitive to illumination change, some approaches [16], convert the RGB space to the HSI space which is partially invariant to light change. Other approaches [9], implement segmentation in the normalized RGB space which is shown to outperform the HSI space [23]. Both the HSI and the normalized RGB space can alleviate the negative effect of illumination change, but still fail on some severe situations. Shape-based approaches detect edges or corners from raw images using canny edge detector or its variants [21]. Then, edges and corners will be connected to regular polygons or circles by using Hough-like voting [19] scheme. These detectors are invariant to illumination change, but the memory and computational requirement is quite high for large images. In [18], a genetic algorithm is adopted to detect circles and is invariant to projective deformation, but the expensive computational requirement limits its application.

Texture-based approaches firstly extract hand-crafted features computed from texture of images, and then use these extracted features to train a classifier. Popular hand-crafted features include HOG, LBP, ACF, etc [12], [17], [11]. Some approaches use the HOG features with a SVM, others [13] use the ACF features with an AdaBoost classifier. Besides the above approaches, a convolutional neural network (CNN) is adopted for traffic sign detection.

Hybrid approaches are a combination of the rementioned approaches. Usually, the initial step is the segmentation to narrow the search space, which is same as the color based approaches. Instead of only using edges features or texture- based features; these methods use them together to improve the detection performance.

One standard benchmark for traffic sign detection is the German traffic sign detection benchmark (GTSDB) which collects three important categories of road signs (prohibitory, danger, and mandatory) from various traffic scenes [20]. All traffic signs have been fully annotated with the rectangular regions of interest (ROIs). Researchers can conveniently compare their work based on this benchmark.

III METHODOLOGY

Image feature extraction is the premise step of supervised learning. It is divided into global feature extraction and local feature extraction. In the work, we are interested in the entire image, the global feature descriptions are suitable and conducive to understand complex image. Therefore, multi-traffic scene perception more concerned about global features, such as color distribution, texture features outdoor conditions. Propose night image enhancement method in order to improve nighttime driving and reduce rear-end accident. Present an effective nighttime vehicle detection system based on image enhancement. Present an image enhancement algorithm for low-light scenes in an environment with insufficient illumination. Propose an image fusion technique to improve imaging quality in low light shooting. Present global and local contrast measurements method for single-image defogging. Present single image dehazing by using of dark channel model. Present a novel histogram reshaping technique to make color image more intuitive. Present a framework that uses the textural content of the images to guide the color transfer and colorization. In order to improve visibility, propose an improved EM method to transfer selective colors from a set of source images to a target image propose a multi -vehicle detection and tracking system and it is evaluated by roadway video captured in a variety of illumination and weather conditions. Propose a vehicle detection method on seven different weather images that captured varying road, traffic, and weather conditions. So reduce the traffic and accident issues.

IV ARCHITECTURE

The following figure describes the system structure which predicts the accurate weather conditions, reduce the traffic issues and another one is accident issues it is major one of problems for nowadays. Using digital image processing time consume is less.

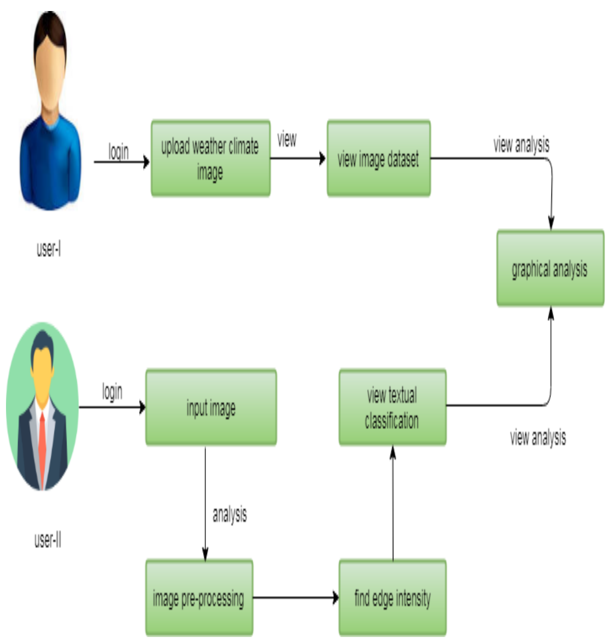

Fig 1: Proposed System Model

IMPLEMENTATION

Our Proposed system consists of the following components:

1. **Weather Reports**

Admin upload the training image weather data set and maintaining the perfect dataset for admin. Any detail is uploading and delete the date in report model. Data set for weather conditions and traffic positions and area finding the location. IN the model admin maintaining the training data set.

2. **Find Weather**

User login the page and upload the weather conditions image and next process image is analysis the admin training data set and lost finding the weather conditions. It is output for digital image processing. They will algorithms using for digital image processing and support vector machine.

3. **Analysis Reports**

They will final report for weather conditions and which area affect for traffic issues finding the final data report. And using support vector machine algorithm split the weather conditions for separate process. And user view the all the data in finding the data process in data set.

4. **Graphical Representations**

The analyses of proposed systems are calculated based on the traffic issues. This can be measured with the help of graphical notations such as pie chart, bar chart and line chart. The data can be given in a dynamical data.

V ALGORITHM

Support Vector Machine

"Support Vector Machine" (SVM) is a supervised machine learning algorithm which can be used for both classification and regression challenges. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiate the two classes very well (look at the below snapshot). The SVM algorithm is implemented in practice using a kernel. The learning of the hyper plane in linear SVM is done by transforming the problem using some linear algebra, which is out of the scope of this introduction to SVM. A powerful insight is that the linear SVM can be rephrased using the inner product of any two given observations, rather than the observations themselves. The inner product between two vectors is the sum of the multiplication of each pair of input values. For example, the inner product of the vectors [2, 3] and [5, 6] is 2*5 + 3*6 or 28. The equation for making a prediction for a new input using the dot product between the input (x) and each support vector (xi) is calculated as follows:

$$f(x) = B0 + sum (ai * (x, xi))$$

This is an equation that involves calculating the inner products of a new input vector (x) with all support vectors in training data. The coefficients B0 and ai (for each input) must be estimated from the training data by the learning algorithm.

Digital Image Processing

It is method to convert an image into digital form and perform some operations on picture or image, in order to obtaining an enhanced image or to extract some useful information from image or picture. In computer science, digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing.

VI CONCLUSION

This paper examined the primary analysis of machine learning method SVM and the Road accidents based on road images are a new and challenging subject, which is widely needed in many sectors. Therefore, the study of weather authorization based on images is an urgent request, which helps detect weather conditions for many visual systems. Classification is a method to classify optical properties for more efficient vision development protocols. In this sheet, eight global basic features are extracted, and 5-tracking learning algorithms are used to understand the multi-traffic road view used to evaluate color features, protocol features, and range features. Thus, the extracted features are more detailed. The proposed eight features have demonstrated that the image attributes cannot accurately describe, but have strong weakness and stability in a complex climate environment. In the future, the proposed instructions should be checked with a larger image package. Integrated learning is a new paradigm in the field of machine learning. It is worth to learn about the generalization of a machine learning system. Visual image expansion mechanisms used in the public film are desirable to further investigate.

VII REFERENCES

[1] S. Agarwal, A. Awan, and D. Roth, “Learning to detect objects in images via a sparse, part-based representation,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 26, no. 11, pp. 1475–1490, Nov. 2004.

[2] T. Ahonen, A. Hadid, and M. Pietikäinen, “Face recognition with local binary patterns,” in Proc. Eur. Conf.

Comput. Vis., 2004 pp. 469–481.

[3] J. Behley, V. Steinhage, and A. B. Cremers, “Laser-based segment classification using a mixture of bag-of-words,” in Proc. IEEE Int. Conf. Intell. Robots Syst., 2013, pp. 4195–4200.

[4] A. Broggi, A. Cappalunga, S. Cattani, and P. Zani, “Lateral vehicles detection using monocular high resolution cameras on terramax,” in Proc. IEEE Intell. Veh. Symp., 2008, pp. 1143–1148.

[5] A. Coates and A. Y. Ng, “The importance of encoding versus training with sparse coding and vector quantization,” in Proc. Int. Conf. Mach. Learn., 2011, pp. 921–928.

[6] J. Cui, F. Liu, Z. Li, and Z. Jia, “Vehicle localisation using a single camera,” in Proc. IEEE Intell. Veh. Symp., 2010, pp. 871–876.

[7] N. Dalal and B. Triggs, “Histograms of oriented gradients for human detection,” in Proc. IEEE Conf. Comput. Vis. Pattern Recogn., 2005, pp. 886–893.

[8] A. de la Escalera, J. M. Armingol, and M. Mata, “Traffic sign recognition and analysis for intelligent vehicles,” Image Vis. Comput., vol. 21, no. 3, pp. 247–258, 2003.

[9] A. De La Escalera, L. E. Moreno, M. A. Salichs, and J. M. Armingol, “Road traffic sign detection and classification,” IEEE Trans. Ind. Electron., vol. 44, no. 6, pp. 848–859, Dec. 1997.

[10] S. K. Divvala, A. A. Efros, and M. Hebert, “How important are de- formable parts in the deformable parts model?” in Proc. Eur. Conf. Comput. Vis. Workshop, 2012, pp. 31–40.

[11] P. Dollár, R. Appel, S. Belongie, and P. Perona, “Fast feature pyramids for object detection,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 36, no. 8, pp. 1532–1545, Jan. 2014.

[12] P. Dollár, S. Belongie, and P. Perona, “The fastest pedestrian detector in the west,” in Proc. Bri. Conf. Mach. Vis., 2010, pp. 1–11.

[13] P. Dollár, Z. Tu, P. Perona, and S. Belongie, “Integral channel features,” in Proc. Bri. Conf. Mach. Vis., 2009, pp. 1–11.

[14] M. Everingham, L. J. V. Gool, C. K. I. Williams, J. M. Winn, and A. Zisserman, “The Pascal visual object classes (VOC) challenge,” Int. J. Comput. Vis., vol. 88, no. 2, pp. 303–338, Jun. 2010.

[15] C. Fang, S. Chen, and C. Fuh, “Road-sign detection and tracking,” IEEE Trans. Veh. Technol., vol. 52, no. 5, pp. 1329–1341, Sep. 2003.

[16] P. F. Felzenszwalb, R. B. Girshick, D. A. McAllester, and D. Ramanan, “Object detection with discriminatively trained part-based models,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 32, no. 9, pp. 1627–1645, Sep. 2009.

[17] J. Friedman, T. Hastie, and R. Tibshirani, “Additive logistic regression: A statistical view of boosting (with discussion and a rejoinder by the authors),” J. Ann. Stat., vol. 28, no. 2, pp. 337–407, 2000.

[18] X. W. Gao, L. Podladchikova, D. Shaposhnikov, K. Hong, and N. Shevtsova, “Recognition of traffic signs based on

their colour and shape features extracted using human vision models," J. Vis. Commun. Image Rep., vol. 17, no. 4, pp. 675–685, 2006.

[19] A. Geiger, P. Lenz, C. Stiller, and R. Urtasun, "Vision meets robotics: The KITTI dataset," Int. J. Robot. Res., vol. 32, no. 11, pp. 1231–1237, 2013.

[20] A. Geiger, C. Wojek, and R. Urtasun, "Joint 3d estimation of objects and scene layout," in Proc. Adv. Neural Inf. Process. Syst., 2011, pp. 1467–1475.

[21] P. Getreuer, "Automatic color enhancement (ace) and its fast implementa- tion," Image Process. Line, vol. 2, pp. 266–277, 2012.

[22] R. B. Girshick, J. Donahue, T. Darrell, and J. Malik, "Rich feature hierarchies for accurate object detection and semantic segmentation," in Proc. IEEE Conf. Comput. Vis. Pattern Recog., 2014, pp. 580–587.

[23] H. Gómez-Moreno, S. Maldonado-Bascón, P. Gil-Jiménez, and S. Lafuente-Arroyo, "Goal evaluation of segmentation algorithms for traffic sign recognition," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 917–930, Jul. 2010.

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