Identifying Text,Visual Objects of Traffic Panels using Text Detection Algorithm

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***Abstract*—**Traffic Panel detection and recognition has been studied from long time. Traffic panel detection and recognition still remains a challenge in computer vision because of different types of information depicted in them. In this context, not only a good visibility of panels is important for a safe use by road users, but also the suitability of the information contained in the traffic panel. In this system we studied a method which detects traffic panels and to recognize the information contained. The main purpose of development of system is to make an automatic inventory of traffic panel. The system is used to help for road support and traffic panel maintenance and assist drivers. In our propose system, images are represented as a "bag of visual words". For text detection where a traffic panel has been detected Optical Character Recognition (OCR) algorithm is used, in order to automatically read and save the information contained in panel. Efficiency of algorithm is proved by the experimental results on real images taken from Google Street View.

Keywords*-Ttraffic panel detection,traffic panel recognition,computer vision,bag of visual words(bovw)*

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I. INTRODUCTION

A real application to intelligent transportation systems (ITS) of a method to detect and recognize text in images taken from natural scenarios.Images are served by Google Street View.This algorithm has proved to be robust in many kinds of real-world scenarios, including different places with a wide variety of text appearance due to different writing styles, fonts, colors, sizes, textures and layouts, as well as the presence of geometrical distortions. Algorithm is applied including some modifications and new functionalities,to read the information contained in traffic panels.We focus on traffic panels in the Spanish territory for some reasons. First, the coverage of Street View in Spain is near complete; thus, we can create a huge data set of images. Second, there is no any official database of all the traffic panels in Spain;thus,there are more possibilities that any government responsible for managing the road network can be interested in having an inventory of the traffic panels with the method proposed.

Aim is to detect traffic panels and to recognize the information inside them, showing that the text detection and recognition method proposed can be generalized to other scenarios, which are completely different to those that have been tested, we develop an application that enables the creation of up-to-date inventories of traffic panel so cites or countries that generate traffic sign posting maintenance and driver assistance. Having a centralized database of all the traffic panels.We supposes a rapid and economic way of evaluating and analyzing the potential dangerous situations that may arise due to traffic panels that suffer from a bad visibility or show deteriorated or outdated information. Street-level panoramic image recording services, such as Street View which have become very popular in there county and have reached a huge coverage of the road network,suppose a potential source to rapidly know the state of the vertical sign posting of the road network, particularly when the street-level images are updated regularly.

Computer vision techniques applied on this kind of images simplify and speedup the creation of traffic sign posting inventories. In addition, these inventories can be useful not only for supporting maintenance but also for developing future driver assistance systems. automatic text reading may be helpful to support drivers or autonomous vehicles to find a certain place by simply reading and interpreting traffic panels or any kind of text present in the scenario, when global positioning systems suffer from lack of coverage, particularly in urban areas. Advanced driver assistance systems could also benefit from text recognition for automatic traffic signs and panels identification. However, traffic panel detection still remains a challenging problem due to several reasons. First, there is a huge variability of traffic panels as each of them depicts different information, varying in size, color, and shape. Moreover, there are large viewpoint deviations due to the fact that the images are captured from a driving vehicle. There may be also occlusions due to vegetation or other road users. In addition, weather and illumination conditions are a key problem in any kind of vision based system. Apart from this, many elements beside road that can be easily confused with traffic panels, such as advertisement panels or truck bodies.

II. MATERIALS AND METHODOLOGY

Traffic sign detection and recognition using computer vision techniques has been an active area of research. A good survey about the main vision-based proposals of the state of the art for intelligent driver assistance systems can be found.

A. Vision-Based Traffic Sign Detection and Analysis

Author in [1] provided an overview of the state of sign detection and the focus has been solely on the detection of signs. It separately describes the contributions of works to the various stages inherent in traffic sign detection: segmentation, feature extraction, and lastly sign detection. Traffic Sign Recognition is a well-established research area, it highlight other research issues in the literature, including of use of publicly available image databases and the over representation of traffic signs. Furthermore, it focuses on future directions of research, including the integration of localization and context. After that it also introduces a new public database containing other countries traffic signs.

B. Goal Evaluation of segmentation Algorithms

This paper [2] has presented research aimed at identifying the
best segmentation methods for its use in automatic road sign recognition systems. It uses different methods employed in previous studies have been implemented, they have been improved to obtain the best results. Other new methods used for this task are proposed, such as SVM, in addition to color spaces not previously tested, such as normalized Ohta. The use of an lookup table (LUT) with some loss of information is also used to improve the speed. Finally, achromatic decomposition in different color spaces has also been presented.

After analysis of data the recognition percentage results for the best method are 69.49% for the test sets and 78.29% for the validation sets. Main conclusion is that a color space- threshold method incorporating illumination normalization constitutes a good choice. In addition, the use of an LUT with some loss of information improves speed and implies that some more lengthy methods could be used with good results. Aim is to carry out an exhaustive study to identify the best segmentation method for this particular task.

C. Automatic Information Recognition of Traffic Panels

It [3] presents an algorithm to detect and recognize the information contained in panels. The aim is to complement the functionality of a traffic sign posting inspection system, which
is able to collect data related to the maintenance state of panels. In this context, not only a good visibility of the panels is vital for a safe use by road users, but also the suitability of the information contained in the panels. The algorithm used which is based on SIFT descriptors to recognize single characters and also to recognize whole words HMMs is used, will be able to make an inventory of the information contained in panels with the aim to check its reliability automatically. Conclusions obtained after analysing a set of images show the effectiveness of method.

D. Visual Categorization with Bag of Key Points

It [4] presents a novel method for generic visual categorization. The problem of identifying the content of images while generalizing across variations inherent to the object class. This bag of key points method is based on vector quantization of affine invariant descriptors of image patches. It propose and compare two alternative implementations using different classifiers: Naïve Bayes and SVM. Advantages of the method are that it is simple, computationally efficient and invariant. It provides results for simultaneously classifying seven semantic visual categories. These results clearly shows that the method is robust to background clutter and produces good categorization accuracy even without exploiting geometric information.

E. Color Thresholding Method for Image Segmentation of Natural Images

This [5] thresholding procedures involved setting of boundaries based on grey values or intensities of image pixels. In this, the thresholding is to be done based on color values in natural images. The color thresholding technique is being carried out based on the adaptation and slight modification of the grey level thresholding algorithm. For RGB color information of the object multilevel thresholding has been conducted. extract it from the background and other objects. Different natural images have been used in the study of color information. The results showed that by using the selected threshold values, the image segmentation has been able to separate the object from the background.

III. CONCLUSION

In this paper, we have presented a real application of the text detection and recognition algorithm. The reliability of part-based models and segmentation has been demonstrated in several data sets. But it has not been proven that they perform better than a constrained BOVW for traffic panel detection. Further research of these techniques for this application and its comparison with our current proposal is a good plan for the near future. False panel detections need to be reduced, particularly for lateral panels. If panel found then the text location and recognition method is applied, in order to reduce the number of false positives and increase the efficiency of algorithm. For the word recognition a unigram language model is used.

Our proposed model was partly based on a fixed dictionary that contained common words that can be found everywhere. The model assumed equal prior probability for all the words. Use of a unigram language model does not take into account i.e. two or more words appearing together. Using language models of a higher order would allow to recognize more precisely the names of places composed of several words. The recognition of the information depicted in the traffic panels was done frame by frame. A panel appeared in several consecutive frames. As future work, we intend to do a multiframe integration of the recognized information at each single frame. In addition, the use of the a priori knowledge that we know about the design of traffic panels would improve the recognition rates, because certain objects, particularly
symbols and numbers, are located only at certain parts of the panels.

IV.REFERENCES

[1] A. Mogelmose, M. Trivedi, and T. Moeslund, "Vision-based traffic sign detection and analysis for intelligent driver assistance systems: Perspectives and survey," IEEE Trans. Intell. Transp. Syst., vol. 13, no. 4,pp. 1484–1497, Dec. 2012.

[2] 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, Dec. 2010.

[3] A. González, L. M. Bergasa, J. Yebes, and M. Sotelo, "Automatic Information recognition of traffic panels using SIFT descriptors an HMMS," in Proc. ITSC, 2010, pp. 1289–1294.

[4] G. Csurka, C. R. Dance, L. Fan, J. Willamowski, and C. Bray, "Visual categorization with bags of keypoints," in Proc. Workshop Stat. Learn. Comput. Vis. ECCV, 2004, pp. 1–22.

[5] N. Kulkarni, "Color thresholding method for image segmentation of natural images," Int. J. Image, Graph. Signal Process., vol. 4, no. 1, pp. 28–34, Feb. 2012.

[6] H. Fleyeh and M. Dougherty, "Road and traffic sign detection and recognition,"in Proc. 10th EWGT Meet./16th Mini-EURO Conf., 2005, pp. 644–653.

[7] A. De la Escalera, J. Armingol, and M. Mata, "Traffic sign recognition and analysis for intelligent vehicles," Image Vis. Comput., vol. 21, no. 3, pp. 247–258, Mar. 2003.

[8] S. Maldonado-Bascon, S. Lafuente-Arroyo, P. Siegmann, H. Gomez- Moreno, and F. J. Acevedo-Rodriguez, "Traffic sign recognition system for inventory purposes," in Proc. IEEE Intell. Vehicles Symp., Jun. 4–6, 2008, pp. 590–595.

[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] J. Miura, T. Kanda, and Y. Shirai, "An active vision system for real-time traffic sign recognition," in Proc. IEEE Intell. Transp. Syst., Oct. 1–3, 2000, pp. 52–57.

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

[12] A. Gonz´alez, L.M. Bergasa, M. Gavil´an, M.A. Sotelo, F. Herranz and C. Fern´andez, Automatic Information Extraction of Traffic Panels based on Computer Vision, 12th International IEEE Conference on Intelligent Transportation Systems, 2009.

[13] M.-Y. Fu and Y.-S. Huang, "A survey of traffic sign recognition," in Proc. ICWAPR, Jul. 2010, pp. 119–124.

[14] J. Canny, "A computational approach to edge detection," IEEE Trans. Pattern Anal. Mach. Intell., vol. PAMI-8, no. 6, pp. 679–698, Nov. 1986