Traffic Panels Detection using Text Detection Algorithm for Text Identification

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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 system we studied a method which detects traffic panels and to recognize the information contained in them. The system is used to help for road support and traffic panel maintenance and assist drivers. The main purpose of development of system is to make an automatic inventory of traffic panel. 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. Efficiency of algorithm is proved by the experimental results on real images.

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

1. INTRODUCTION

A real application to intelligent transportation systems (ITS) of a method to detect and recognize text in images taken from natural scenarios. Images 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. This 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 not 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, without needing to retrain the system and 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 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 centy ears 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 them 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.

2.1 Text Recognition on Traffic Panels from Street-level Imagery

Author in [1] provided text detection and recognition in images taken in uncontrolled environments still remains a challenge in computer vision. This presents a method to extract the text depicted in road panels in street view images as an application to Intelligent Transportation Systems (ITS). It applies a text detection algorithm to the whole image together with a panel detection method to strengthen the detection of text in road panels. Word recognition is based on Hidden Markov Models, and a Web Map Service is used to increase the effectiveness of the recognition. In order to compute the distance from the vehicle to the panels, a function that estimates the distance in meters from the text height in pixels has been obtained. After computing the direction vector of the vehicle, world coordinates are computed for each panel. Experimental results on real images from Google Street View prove the efficiency of our proposal and give way to using street-level images for different applications on ITS such as traffic signs inventory or driver assistance.

2.2 CSIFT: A SIFT Descriptor with Color Invariant Characteristics

This [2] has been proven to be the most robust local invariant feature descriptor. SIFT is designed mainly for gray images. However, color provides valuable information in object description and matching tasks. Many objects can be misclassified if their color contents are ignored. This paper addresses this problem and proposes a novel colored local invariant feature descriptor. Instead of using the gray space to represent the input image, the proposed approach builds the SIFT descriptors in a color invariant space. The built Colored SIFT (CSIFT) is more robust than the conventional SIFT with respect to color and photometrical variations. The evaluation results support the potential of the proposed approach.

2.3 Evaluating Color Descriptors for Object and Scene Recognition

In [3] image category recognition is important to access visual information on the level of objects and scene types. So far, intensity-based descriptors have been widely used for feature extraction at salient points. To increase illumination invariance and discriminative power, color descriptors have been proposed. Because many different descriptors exist, a structured overview is required of color invariant descriptors in the context of image category recognition. Therefore, this paper studies the invariance properties and the distinctiveness of color descriptors in a structured way. The analytical invariance properties of color descriptors are explored, using a taxonomy based on invariance properties with respect to photometric transformations, and tested experimentally using a dataset with known illumination conditions. In addition, the distinctiveness of color descriptors is assessed experimentally using two benchmarks, one from the image domain and one from the video domain.

From the theoretical and experimental results, it can be derived that invariance to light intensity changes and light color changes affects category recognition. The results reveal further that, for light intensity shifts, the usefulness of invariance is category-specific. Overall, when choosing a single descriptor and no prior knowledge about the dataset and object and scene categories is available, the Opponent SIFT is recommended.
Furthermore, a combined set of color descriptors outperforms intensity-based SIFT and improves category recognition by 8% on the PASCAL VOC 2007 and by 7% on the Media mill Challenge.

2.4 Automatic Information Recognition of Traffic Panels

It [4] 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.

2.5 Automatic Traffic Signs and Panels Inspection System Using Computer Vision

In [5] Computer vision techniques applied to systems used on road maintenance, which are related either to traffic signs or to the road itself, are playing a major role in many countries because of the higher investment on public works of this kind. These systems are able to collect a wide range of information automatically and quickly, with the aim of improving road safety. In this context, the correct visibility of traffic signs and panels is vital for the safety of drivers. This paper describes an approach to the VISUAL Inspection of Signs and panels ("VISUALISE"), which is an automatic inspection system, mounted onboard a vehicle, which performs inspection tasks at conventional driving speeds. VISUALISE allows for an improvement in the awareness of the road signaling state, supporting planning and decision making on the administration’s and infrastructure operators’ side. A description of the main computer vision techniques and some experimental results obtained from thousands of kilometers are presented. Finally, the conclusions of the system are described.

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, where a panel is found the text location and recognition method was 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 and partly based on a dynamic dictionary that depends on the province where the traffic panel is located. The model assumed equal prior probability for all the words. As future work, we intend to compute the prior probabilities of language models of a higher order would allow to recognize more precisely the names of places composed all the words in the dictionary to allow a more precise and reliable recognizer. In the same way, the use of a unigram language model does not take into account the likelihood of two or more words appearing together. Using 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.

REFERENCES


