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Literature Survey on Vehicle Recognition for Augmented Reality Using Android Smart Phones

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Abstract - *The Optical Character Recognition is a mobile application. It uses smart mobile phones of android platform. This paper combines the functionality of Optical Character Recognition and speech synthesizer. The objective is to develop user friendly application Number plate extraction is that stage where vehicle number plate is detected and extract the number plate text. The segmented characters are normalized and passed to an OCR algorithm. At last, the optical character information will be converted into encoded text. The characters are recognized using Template matching. The final output must be in the form of string of characters. Augmented Reality is a breakthrough technology that could considerably ease execution of complex operations. Augmented Reality mixes virtual and actual reality, making available to the user new tools to ensure efficiency in the transfer of knowledge for several processes and in several environments.*

Key Words*: *Augmented Reality, Optical Character Recognition, OCR, android, vehicle number plate recognition

1.INTRODUCTION

Vehicle Number Plate Recognition using Optical Character Recognition (OCR) Using Android Number plate recognition is designed to identify the number plate and then recognize the vehicle number plate from a moving vehicle automatically. Automatic number plate recognition has two major parts: Vehicle number plate extraction, Optical Character Recognition (OCR).

Number plate extraction is that stage where vehicle number plate is detected and extract the number plate text. The segmented characters are normalized and passed to an OCR algorithm. At last, the optical character information will be converted into encoded text. The characters are recognized using Template matching. The final output must be in the form of string of characters.

The main focus in this research project is to experiment deeply with, and find alternative solutions to the image segmentation and character recognition problems within the License Plate Recognition framework. Three main stages are identified in such applications. First, it is necessary to locate and extract the license plate region from a larger scene image. Second, having a license plate region to work with, the alphanumeric characters in the plate need to be extracted from the background. Third, deliver them to an OCR system for recognition. In order to identify a vehicle by reading its license plate successfully, it is obviously necessary to locate the plate in the scene image provided by some acquisition system (e.g., video or still camera). Locating the region of interest helps in dramatically reducing both the computational expense and algorithm complexity. For example, a currently common 1024x768 resolution image contains a total of 786,432 pixels, while the region of interest (in this case a license plate) may account for only 10% of the image area. Also, the input to the following segmentation and recognition stages is simplified, resulting in easier algorithm design and shorter computation times. The paper mainly works with the standard Egyptian license plates but the techniques, algorithms and parameters that is be used can be adjusted easily for any similar number plates even with other alpha-numeric set.

In this section the process of automatic number plate recognition consists of four main stages: Pre-processing, License plate localization, Character recognition. The system can be used for toll plaza, parking area, highly security areas, boarder's areas etc. Authentication, manage record, easy communication, notification, history of fines and Manage users.

1.1 Augmented reality (AR)

Augmented reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, hepatic, somatosensory and olfactory.AR can be defined as a system that fulfils three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects. The overlaid sensory information can be constructive (i.e., additive to the natural environment), or destructive (i.e., masking of the natural environment). This experience is seamlessly interwoven with the physical world such that it is perceived as an immersive aspect of the real environment.

In this way, augmented reality alters one's ongoing perception of a real-world environment, whereas virtual reality completely replaces the user's real-world environment with a simulated one. Augmented reality is related to two largely synonymous terms: mixed reality and computer-mediated reality.

AR working and algorithm:
A key measure of AR systems is how realistically they integrate augmentations with the real world. The software must derive real world coordinates, independent of camera, and camera images. That process is called image registration, and uses different methods of computer vision, mostly related to video tracking. Many computer vision methods of augmented reality are inherited from visual odometer. An augograms is a computer-generated image that is used to create AR. Autography is the science and software practice of making augograms for AR.

Usually, those methods consist of two parts. The first stage is to detect interest points, fiducially markers or optical flow in the camera images. This step can use feature detection methods like corner detection, blob detection, edge detection or thresholding, and other image processing methods. The second stage restores a real-world coordinate system from the data obtained in the first stage. Some methods assume objects with known geometry (or fiducially markers) are present in the scene. In some of those cases the scene 3D structure should be calculated beforehand. If part of the scene is unknown simultaneous localization and mapping (SLAM) can map relative positions. If no information about scene geometry is available, structure from motion methods like bundle adjustment are used. Mathematical methods used in the second stage include: projective (epipolar) geometry, geometric algebra, rotation representation with exponential map, Kalman and particle filters, nonlinear optimization, robust statistics.

In augmented reality, the distinction is made between two distinct modes of tracking, known as marker and marker less. Markers are visual cues which trigger the display of the virtual information. A piece of paper with some distinct geometries can be used. The camera recognizes the geometries by identifying specific points in the drawing. Marker less tracking, also called instant tracking, does not use markers. Instead, the user positions the object in the camera view preferably in a horizontal plane. It uses sensors in mobile devices to accurately detect the real-world environment, such as the locations of walls and points of intersection

Augmented Reality Mark-up Language (ARML) is a data standard developed within the Open Geospatial Consortium (OGC), which consists of Extensible Mark-up Language (XML) grammar to describe the location and appearance of virtual objects in the scene, as well as ECMAScript bindings to allow dynamic access to properties of virtual objects.

To enable rapid development of augmented reality applications, some software development kits (SDKs) have emerged.

2. LITERATURE REVIEW

Significant research and development of algorithms in intelligent transportation has grabbed more attention in recent years. An automated, fast, accurate and robust vehicle plate recognition system has become need for traffic control and law enforcement of traffic regulations; and the solution is ANPR. This paper is dedicated on an improved technique of OCR based license plate recognition using neural network trained dataset of object features.

A blended algorithm for recognition of license plate is proposed and is compared with existing methods for improve accuracy. The whole system can be categorized under three major modules, namely License Plate Localization, Plate Character Segmentation, and Plate Character Recognition. The system is simulated on 300 national and international motor vehicle LP images and results obtained justifies the main requirement.

In this Vehicle's plate number is a unique identity by which individual vehicle can be identified. Vehicle plate recognition system helps to capture a vehicle plate number, extract the numbers on the plate and check the details of the car owner. As the number of car owners in a country increases, identifying and charging unlawful vehicles on the road has been a tedious work for law enforcement agents. In this paper, we present an automatic vehicle plate recognition system using Raspberry pi. A Camera was incorporated to
help in capturing the plate number images and it is interfaced to a Raspberry pi processor for authentication. Using the Open Computer Vision (Open CV) and Optical Character Recognition (OCR), the system can extract numbers from the captured plate image and completely automate the license plate recognition. The experimental results from several testing in different locations and conditions show that the system performed better than most of the baseline studies considered.

In automatic detection and recognition of car number plates has become an important application of artificial vision systems. Since the license plates can be replaced, stolen or simply tampered with, they are not the ultimate answer for vehicle identification. The objective is to develop a system whereby vehicle identification number (VIN) or vehicle chassis number is digitally photographed, and then identified electronically by segmenting the characters from the embossed VIN. In this paper we present a novel algorithm for vehicle chassis number

identification based on optical character recognition (OCR) using artificial neural network. The algorithm is tested on over thousand vehicle images of different ambient illumination. While capturing these images, the VIN was kept in-focus, while the angle of view and the distance from the vehicle varied according to the experimental setup. These images were subjected to pre-processing which comprises of some standard image processing algorithms. The resultant images were then fed to the proposed OCR system. The OCR system is a three-layer artificial neural network (ANN) with topology 504-600-10. The major achievement of this work is the rate of correct identification, which is 95.49% with zero false identification.

Several License Plate Recognition systems have been developed in the past. Our objective is to design a system implemented on a standard camera-equipped mobile phone, capable of recognizing vehicle license number. As a first step towards it we propose a license plate text segmentation approach that is robust to various lighting conditions, complex background owing to dirty or rusted LP and non-convential fonts. In the Indian scenario, some vehicle owners choose to write their vehicle number plates in regional languages. Since our method does not rely on language-specific features, it is therefore capable of segmenting license number written in different languages. Using color connected component labeling, stroke width and text heuristics we perform the task of accurately segmenting the number from the license plate. Experiments carried out on Indian vehicle license plate (LP) images acquired using a camera-equipped cellphone shows that our system performs well on different LP images some with different types of degradations. OCR evaluation on the extracted LP number text with the proposed method has an accuracy of 98.86%

2019 2nd International Conference on Intelligent Communication and Computational Techniques (ICCT) Summary: Automatic license plate recognition is being widely used for numerous applications since its inception. The ability to procure license plate numbers accurately has been beneficial in maintaining traffic rules, parking enforcement, and security. In this paper, we have discussed the results of using ALPR for recognition of anonymous vehicles entering our university campus. We used deep learning for license plate localization and Tesseract OCR for license plate recognition. By doing so we could read the license plates of vehicles entering a particular campus and verify if the vehicle are authorized by comparing it with a predefined list of authorized vehicles. To efficiently extract these number plates, we have trained our model using Faster RCNN and tuned it to get the best output. The results of which have been discussed in this paper. Further, the image processing techniques used for preprocessing the identified number plate have been mentioned here. For character segmentation and character recognition, we have used tesseract. While training our model for number plate extraction the minimum loss obtained was 0.011 with RMS prop optimizer at initial learning rate 0.002.

3. PROBLEM STATEMENT

The main focus in this research project is to experiment deeply with, and find alternative solutions to the image segmentation and character recognition problems within the License Plate Recognition framework.

4. PROPOSED SYSTEM

Following are the stages of the above proposed System:

Three main stages are identified in such applications. State 1: First, it is necessary to locate and extract the license plate region from a larger scene image. State 2: Second, having a license plate region to work with, the alphanumeric characters in the plate need to be extracted from the

background. State 3: Third, deliver them to an OCR system for recognition. In order to identify a vehicle by reading its license plate successfully, it is obviously necessary to locate the plate in the scene image provided by some acquisition system (e.g., video or still camera).

Fig 1. Localized number plate

(a) localized LP (b) Dilated image

Fig 2 Image dilation on number plate

Fig 3. Segmented Character

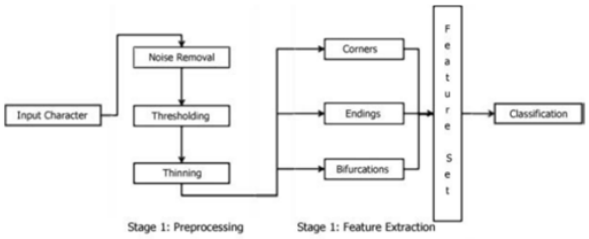

Fig 4 Block diagram of feature extraction based on OCR

5. CONCLUSIONS

The main focus in this research project is to experiment deeply with, and find alternative solutions to the image segmentation and character recognition problems within the License Plate Recognition framework. Three main stages are identified in such applications. First, it is necessary to locate and extract the license plate region from a larger scene image. Second, having a license plate region to work with, the alphanumeric characters in the plate need to be extracted from the background. Third, deliver them to an OCR system for recognition. In order to identify a vehicle by reading its license plate successfully, it is obviously necessary to locate the plate in the scene image provided by some acquisition system (e.g., video or still camera).

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