Decentralized Access Control and Tracking System for Vehicles using Open Source Tools

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Abstract: **Decentralised access control and tracking system is a robustly working framework which uses ANPR (Automatic Number Plate Recognition) for localisation and identification of number plates. Image Processing is the primary source which is predominantly divided into four stages such as Pre Processing, Segmentation, Feature Extraction and Recognition. Typically image processing is done on high level computing devices using MATLAB which cannot be accessed without permit. This paper approaches a cost proficient and freely accessible technology like Open CV & Python. Our proposed strategy deals with vehicles having number plate of various size, shades, textual style and shapes. The system does not rely on a central authority, the data transfer is quicker and secure by decentralization.**

Keywords: **Decentralized, Automatic Number Plate Recognition, Robust, Open CV, Python.**

1. Introduction

In recent years we can notice all developing countries suffering from vehicle parking due to increase in number of vehicles, it is also difficult to find the culprits who violates traffic rules, causes accidents and thefting. Our solution to this can be resolved by developing a control tool which is offered to all states and municipalities to allow mobility, traffic management and safety improvement. It also offers the user to search in the history of detections by ANPR method to detect vehicles that violate the traffic rules and endanger the lives of pedestrians and other drivers. This analytical system implementation and development in the countries improves road safety, making cities safer with more human's following the right rules. An essence for access control is again an ANPR system which allows parking lots to gain effective real-time information on vehicles arrival and departure. The authorized and restricted vehicles access is managed by continuously recognizing license plates and acting on access barriers accordingly. Access control can widely be used in areas like universities, residential condominiums, malls, parking lots, border control and tolling with barrier. In general, automatic number plate recognition is a technology that uses OCR method on a real-time image to read vehicles registration plate. ANPR can either be used to store text from the license plate or the complete images captured by the camera. Here the image processing for ANPR is conducted using Open CV and python.

2. Literature review

1. This paper involves pre-processing step which is used to convert a colour image to a grey scale image then further to a black and white image. Vertical profile projection is used for segmentation of characters. The main two techniques used is statistical and zoning, this improves system's accuracy. Area, shape and perimeter of the image are dependent on statistical features whereas zoning feature includes calculation of pixel density by segmenting input image into predefined zones.

2. In dynamic complex environment, it is important to detect moving objects for vehicle system that is autonomously unmanned. The paper approaches the detection of motion of objects and their state of motion on mobile platforms using consecutive stereo image pairs. This approach gains accurate detection output. As by products direction, velocity and location are obtained.

3. This paper exhibits a viable evening vehicle location framework that consolidates a novel bio inspired picture improvement approach with a weighted element combination system. Inspired by the retinal mechanism in natural visual processing, we build up an evening picture upgrade technique by displaying the versatile input from level cells and the inside encompass opposing open fields of bipolar cells. Besides, we concentrate highlights dependent on the convolutional neural system, histogram of arranged angle, and neighbourhood paired example to prepare the classifiers with help vector machine. Our proposed technique can manage different scenes including vehicles of various sorts and estimates and those with impediments and in obscured zones. It can likewise identify vehicles at different areas and numerous vehicles.

4. In this paper, creators present a successful coarse-to-fine approach for finding different Ship License Numbers (SLNs). The sources of info incorporate pictures or picture groupings. The yields are the SLN data. The framework comprises of picture catching, permit number area, character extraction and character acknowledgment. The proposed methodology is then applied to two gathered datasets.

5. Submerged pictures regularly experience the ill effects of shading mutilation and low differentiation, since light is

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Table 1
Literature review

Author	Year	Technique	Advantages
Mohit N. Tanurkar , Dr. Milind V. Bhalerao ,Amol A. Kadam	2019	Statistical feature and zoning based extraction technique	High recognition rate
Long Chen, Lei Fan, Guodong Xie, Kai Huang, Andreas Nuchter,	2017	Consecutive stereo image pairs using slanted plane smoothing	Competitive results interms of moving object detection and their motion state estimation
Hulin Kuang, Xianshi Zhang, Yong-Jie Li, Leanne Lai Hang Chan and Hong Yan	2017	Bio-inspired image enhancement and weighted feature fusion technique	Helps in detecting vehicles of different types and sizes with occlusions and in blurred zones
Baolong Liu, Jia Sheng, Jingyu Dun, Sanyuan Zhang Zhenjie Hong and Xiuzi Ye,	2017	Text region extraction, prior feature based SLN fine location and fake SLN elimination	Apart from the disturbances caused by water waves the number plate can be identified
Yan-Tsung Peng, Student and Pamela C. Cosman ,	2017	Image enhancement and restoration using Image Formation Method	Estimates under water seen depth image more accurately
Honghui Fan, Hongjin Zhu	2017	Separation method using fourier description	Improves the detection accuracy of vehicles from camera images in real time
Dong Xiaoheng, Li Minghang, Miao Jiashu, Wang Zhengyu,	2018	Image edge detection based on wavelet transform	Extraction of feature edge of an image which provides reliable information for subsequent target recognition
S.Thiyagarajan, Dr.G.Saravana Kumar, E.Praveen Kumar, G.Sakana	2018	Optical character recognition and technology of speech synthesis	Enables recognition of the text from image data into digital format which can be accessed easily by machines
Rishabh Mehta, Naman Kapoor, Soumya Sourav, Rajeev Shorey	2019	Decentralised image processing using properties of block chain	Automatically detects and rejects perceptually similar images on a decentralised image sharing platform
Pratiksha Jain, Neha Chopra, Vaishali Gupta	2014	Automatic license plate recognition using computer vision technology	Ease of use, memory management and developmental environment
B.Santosh manoj kumar, M.V.K.Prasad, K.Sripath Roy	2019	Optical character recognition technique	Detects and recognises number plates of authorised vehicles automatically
Sanampudi Priyanka	2017	Internet of Things using RFID and ALPR	Access control, information about vehicles and tracking
Md. Zainal Abedin, Atul Chandra Nath,Prashengit Dhar, Kaushik Deb, Mohammad Shahadat Hossain	2018	Contour filtering, deep learning and convolution neural network	Detection of license plate images taken in different illuminations, road scenarios and coloured vehicles
Noorpreet Kaur Gill, Anand Sharma	2017	Segmentation supporting thresholding technique	Captures full number of satellites vehicle image within the desired space
Han Sang Lee, Helen Hong, Junmo Kim	2017	Kidney ROI detection, mass candidate extraction, false positive reduction and mass segmentation	High resolution image is acquired with best quantity and quality

dispersed and consumed when going through water. Such pictures with various shading tones can be shot in different lighting conditions, making reclamation and upgrade difficult. We propose a profundity estimation technique for submerged scenes dependent on picture haziness and light assimilation, which can be utilized in the picture development model (IFM)to reestablish and improve submerged pictures. Past IFM-based picture rebuilding techniques gauge scene depth based on the dim channel earlier or the most extreme power earlier. The proposed strategy gauges submerged scene profundity all the more precisely. Test results on reestablishing genuine and blended submerged pictures exhibit that the proposed technique beats other IFM-based submerged.

6. The author proposes a new method of separation of vehicle detection area which is used to improvise the detection of vehicles from camera images and videos in real time. The traffic monitoring system comprises of detecting and tracking of vehicles using Internet of Things and computer vision. If a vehicle occupies the area of another, it overlaps and is considered as a single area which has to be separated. The present technology doesn't have a feature to separate the area. This paper proposes a new method of separation

using the Fourier descriptor by reshaping the area.

7. The author aims in extraction of the edges of an underwater digital image. As the underwater image is of low contrast and has edge blurness, a new integrant on wavelet transform edge detection is introduced. The false edges and remaining edges of an image are eradicated using this methodology. The feature edge is obtained successfully from the image which delivers the necessary information for image recognition extraction.

8. This paper uses optical character recognition to identify texts of various types from images which are converted into electronic images. The speech synthesis technology allows these electronic images to be translated in human voice and is played through a Bluetooth headphone. This system comprises of a raspberry pi, web camera and a Bluetooth headphone. The main objective is to benefit the visually impaired people to advise them on their requirements in the daily life.

9. The intention of this paper is to overcome the main problem of correct image attribution for digital photos uploaded on various websites to recognize the original photographers and are credited for their works. Therefore, a decentralized peer to peer photo sharing is constructed on an Ethereum

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test chain to demonstrate the loyalty and practicality. The tampered images similar to the real images available on the market are recognized using the appropriate hashes and smart contracts available on Ethereum in the decentralized application. This work provides a great platform for the photographers to preserve their copy writes on their work shared on a decentralized photo sharing platform.

10. Automatic License Plate Recognition is a system which identifies the number plate of vehicles automatically in real time. This method has various complexities due to diverse effects of speed and light illumination. Automatic License Plate Recognition has a wide range of applications like parking management, high alert security systems, traffic control, etc. Majority number of Automatic License Plate Recognition systems are built upon tools like MATLAB which are not cost efficient. In this paper, the system is implemented on free software's like Python and Open CV.

11. The author proposes an efficient system for university campus number plate logging system using Automatic number plate recognition (ANPR). ANPR is an image processing technology used to identify the vehicle number plate automatically. The developed system detects the vehicle primarily and extracts the region of the number plate by segmentation of images and videos. Optical character recognition is used for electronic conversion of characters in the number plate. This processed data is stored on to a database for further information like vehicle in time, out time. This system is simulated on technologies like mongoDB, Tensorflow, Open CV and is performed on real time images and videos.

12. This paper intent to build a system which combines RFID and automatic license plate recognition (ALPR) for tracking and vehicle access control using Internet of Things. ALPR is combined with RFID to identify a vehicle as an authenticated vehicle. Using Internet of Things, vehicle number plates are registered onto it which makes the tracking of vehicles simpler. RFID tags are mounted onto the automobiles. These tags are identified by the RFID reader and both are matched and analysed. This detects the vehicle as an authenticated vehicle and allows.

13. The proposed system in this paper is designed on the footing of tools like computer vision and deep machine learning. The main agenda here is to detect, localize and crop vehicle plate's region of interest. It undergoes following process like image pre-processing, binary image conversion, detection and filtering of contours to obtain character outline of license plate and correction of tilts. Hence obtaining the clear cut license plate. This implementation is done on python Open CV environment. This system also works for different road scenarios, weather condition, illuminations and coloured cars.

14. Vehicle detection from satellite image is a challenging task. This paper approaches capturing of vehicle images from the satellite to obtain better rate of accuracy. This system works by capturing various number of vehicles enclosed in a desired space. Apart from the difficulties caused by the factors like weather, illumination, chaos and shadows the rate of detection and identifications of vehicleimages is boosted by enhancing the satellite pictures acquisition before the extraction of vehicle image. The results from the work can be assisted in geographic areas.

15. Detection and division of small renal mass in renal CT pictures are significant pre-handling for computer aided determination of renal malignant growth. In any case, the errand is known to challenge because of its assortment of size, shape, and area. In this paper, we propose a mechanized strategy for recognizing and portioning SRM interestingly improved CT pictures utilizing surface and setting highlight order. To start with, kidney ROIs is dictated by power and area thresholding. Second, mass up-and-comers are separated by force and area thresholding. Third, false positive decrease is applied with fix based surface and setting highlight arrangement. At long last, mass division is performed, utilizing the recognition results as a seed, with locale developing, dynamic forms, and exception expulsion with size and shape criteria.
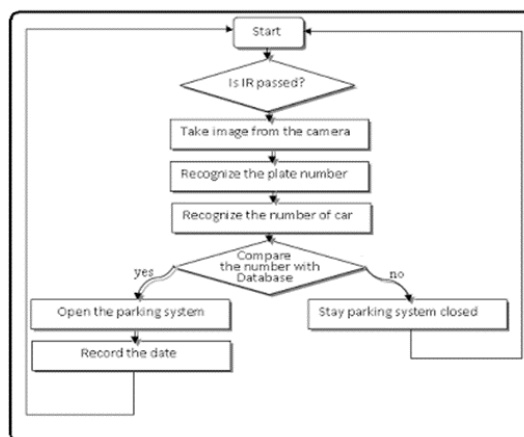
3. Conclusion

This paper presented an overview on decentralized access control and tracking system for vehicles using open source tools.

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