

RUNNING VEHICLE NUMBER PLATE DETECTION

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ABSTRACT

The Number Plate Recognition System using OpenCV is a Python-based project that utilizes the OpenCV library to detect and identify license plates in images and videos. The system employs a trained Haar cascade model provided by OpenCV specifically designed for license plate detection. The project consists of two main components: readimage.py and readvideo.py.

The readimage.py file is responsible for detecting number plates from an input image. It applies the trained Haar cascade model to locate the license plate, draws a boundary around it, and blurs the plate for privacy. The system then extracts the text from the plate using optical character recognition (OCR) techniques, enabling the identification of the license plate's content.

Similarly, the readvideo.py file extends the functionality to process video files. It analyzes each frame of the video, detects license plates, and performs the same identification process as in the image detection module. This enables the system to recognize license plates in real-time video footage.

To use the system, ensure you have Python 3.7 or later installed, along with the necessary dependencies such as OpenCV (version 4 or above) and NumPy. The project includes a pre-trained Haar cascade model, haarcascade_russian_plate_number.xml, which is used for license plate detection.

The project provides a practical implementation of license plate recognition using computer vision techniques. It can be utilized for various applications, including traffic monitoring, parking management, and law enforcement.

1. INTRODUCTION

Automatic Number Plate Recognition or ANPR is a technology that uses pattern recognition to 'read' vehicle number plates. In simple terms ANPR cameras 'photograph' the number plates of the vehicles that pass them. This 'photograph' is then fed in a computer system to find out details about the vehicle itself. ANPR consists of cameras linked to a computer. As a vehicle passes, ANPR 'reads' Vehicle Registration Marks – more commonly known as number plates - from digital images, captured through cameras located either in a mobile unit, in-built in traffic vehicles or via Closed Circuit Television (CCTV). The digital image is converted into data, which is processed through the ANPR system. We proposed a method mainly based on edge detection, OCR operation and Finding Rectangles in a Vehicle Image.

Owning a vehicle today is not merely a symbol of luxury but has become a necessity. However, considering vehicles, any catastrophic situation can take place. Therefore there is always an urgent need to arrange appropriate measures to increase the safety, security as well as monitor the vehicles to avoid any mishap. It would help us in the situations such as: Instantaneously obtain vehicle details using image processing. Allowing an agency to detect the location of its vehicles.

Automatically notify the user if there are traffic violations registered to the vehicle. One such measure is the use of a vehicle tracking system using the GPS (Global Position System). Such a tracking system includes a mechanized device that is

equipped in a vehicle. Using software present at an operational base, it helps track the location of the vehicle. This base station is used for monitoring purposes. It is accompanied by maps such as Google maps, Here maps, Bing maps etc for the representation of the location.

2. LITERATURE SURVEY AND RELATED WORK

INTRODUCTION:

Literature survey is the process in which a complete and comprehensive review is conducted encompassing both the published and unpublished work from other alternative sources of information. This review is conducted in the domains of specific interest to the person or researcher. Further, the results of this process are documented. This entire process comes in aid of the researcher to address the important and relevant aspects of the research that had not been addressed prior to the conduction of this research. Therefore it can be understood that the conduction of literature survey is necessary for the process of gathering secondary data for the research which might prove to be extremely helpful in the research and also designing the architecture of the project. There can be multiple reasons behind the purpose of conducting literature survey.

PAPER 1:

Title:

Amninder Kaur, Sonika Jindal ,Richa Jindal "License Plate Recognition Using Support Vector Machine (SVM)" Dept. Of Computer Science, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 7.

Context:

ANPR is a mass surveillance system that captures the image of vehicles and recognizes their license number. In this paper, A system is proposed that incorporates to successfully locate and read Indian vehicle number plates in digital images by using SVM. In this proposed model pre- processing and number plate localization is performed by using —Otsu's methods and —feature based localization methods respectively. It gives reliability and time optimization. Finally, the character reorganization performs using the Support Vector Machine.

In this paper, another algorithm to number recognition is proposed. This technique uses a SupportVector Machine (SVM) to train character samples and obtain the rules that are used to recognize.

PAPER 2:

Title:

Anish lazrus, siddhartha choubey, sinha g.r., "an efficient method of vehicle number plate detection and recognition" department of computer

Science, international journal of machine intelligence, volume 3, issue 3.

Context:

The images of various vehicles have been acquired manually and converted into grayscale images. Then the wiener2 filter is used to remove noise present in the plates. The segmentation of grayscale image generated by finding edges using sobel filter for smoothing image is used to

Reduce the number of connected components and then bilateral filter is used to calculate the connected component. Finally, a single character is detected.

However, sets of blurry and skewed snapshots give worse recognition rates than a set of snapshots, which has been captured clearly due to rapidly increase in number of vehicles across the world's big cities, vehicle number plate recognition system has become one of the most important digital image processing systems to be used. This system will solve so many problems for these city facilities which are hard to be controlled by humans 24 hours.

3. EXISTING SYSTEM

Online ANPR framework: In an online ALPR framework, the limitation and elucidation of tags occur promptly from the approaching video outlines, enabling Real-time tracking through the surveillance camera.

Example: OpenALPR CloudWatch

Offline ANPR framework: A logged off ALPR framework, interestingly, catches the shovel, dumper number plate pictures and stores them in a concentrated information server for further preparation, i.e. for translation of vehicle number plate

Example: OpenALPR Library

Looking at the works of other countries pushes and inspire us to try to solve the challenges that we face in our country and also motivates us to use ANPR in all facets.

United States

Mobile ANPR use is widespread among US law enforcement agencies at the city, county, state and federal level. According to a 2012 report by the Police Executive Research Forum, approximately 71% of all US police departments use some form of ANPR. Mobile ANPR is becoming a significant component of municipal predictive policing strategies and intelligence gathering, as well as for recovery of stolen vehicles, identification of wanted felons, and revenue collection from individuals who are delinquent on city or state taxes or fines, or monitoring for "Amber Alerts".

United Kingdom

The Home Office states the purpose of automatic number-plate recognition in the United Kingdom is to help detect, deter and disrupt criminality including tackling organized crime groups and terrorists. Vehicle movements are recorded by a network of nearly 8000 cameras capturing between 25 and 30 million ANPR 'read' records daily. These records are stored for up to two years in the National ANPR Data Centre, which can be accessed, analyzed and used as evidence as part of investigations by UK law enforcement agencies.

Saudi Arabia

Vehicle registration plates in Saudi Arabia use white background, but several vehicle types may have a different background. United States diplomatic plates have the letters 'USD', which in Arabic reads 'DSU' when read from right to left in the direction of Arabic script. There are only 17 Arabic letters used on the registration plates. A Challenge for plates recognition in Saudi Arabia is the size of the digits. Some plates use both Eastern Arabic numerals and the 'Western Arabic' equivalents. A research with source code is available for ANPR Arabic digits.

Turkey

The system has been used with two cameras per lane, one for plate recognition, one for speed detection. Now the system has been widened to network all the registration number cameras together, and enforcing average speed over preset distances. Some arteries have 70 km/h (43 mph) limit, and some 50 km/h (31 mph), and photo evidence with date-time details are posted to registration address if speed violation is detected. As of 2012, the fine for exceeding the speed limit for more than 30% is approximately US\$175.

Canada

The police service in Ontario uses automatic licence-plate recognition software[21] to nab drivers behind the wheels of vehicles with Ontario number plates..

4.PROPOSED SYSTEM

Automatic Number Plate Recognition using an efficient OCR engine like Pytesseract along with major and vast libraries of OpenCV for image processing. As we have seen so far ANPR covers as a solution to most of the problems we have posed. We would like to dig a bit deeper now and highlight the scope of the project and the extent to which we can push the boundaries. The main issue that is usually recognized when it comes to number plate detection is the noise that is added to the image in the process of capturing the image or due to the environment around, taking that into consideration we can say that using our system, we can implement it in all environments, be it rain or even in the dark. Usually when any new system is proposed to possible clients, their main concern is the addition of new features into their existing system. Keeping this in mind we can say for sure that our system can be integrated to the pre-existing infrastructure of most clients.

Using a web crawler, number plate recognized is parsed to the government website vahan.nic.in along with the solved captcha and the vehicle details can be accessed for further Inference and analysis. Also showcase the vulnerabilities in the security of the government websites and privacy issues in government website. Also provide analytics and solution on the extracted data.

Advantages of the proposed system:

- To perform successful and efficient preprocessing on the raw RGB image
- To exploit the high performance and effectiveness of OpenCV and Pytesseract framework to detect and recognize LP of vehicles,to improve our system reliability.
- To correctly determine the number plate based on Indian Number plate Standards
- To Successfully extract the information from Government vehicle information database

- To Show the security vulnerabilities on vahan.nic.i

5. IMPLEMENTATION

Data Collection and Preprocessing:

Collect a diverse dataset of images containing vehicles and their number plates.

Annotate the number plates in the images.

Preprocess the dataset by resizing, normalizing, and augmenting the images.

Vehicle Detection:

Use a pre-trained object detection model like YOLO (You Only Look Once) or Faster R-CNN to detect vehicles in the images.

Fine-tune the model on your dataset if necessary.

Number Plate Localization:

After detecting vehicles, you need to localize the number plates within the detected vehicle bounding boxes.

You can use techniques like contour detection, template matching, or deep learning-based methods for number plate localization.

Number Plate Recognition:

Once you've located the number plates, use an Optical Character Recognition (OCR) system to recognize the characters on the plate.

Tesseract OCR is a popular open-source library for this task.

Post-processing:

Implement post-processing steps to refine the OCR results, such as character filtering, text segmentation, and spell-checking.

User Interface (Optional):

Create a user-friendly interface for users to interact with the system, such as a web application or mobile app.

Database Integration (Optional):

If needed, integrate a database to store and manage the detected number plate data along with timestamps and other relevant information.

Alerting and Logging (Optional):

Implement alerting mechanisms or logging systems to track and report suspicious or unauthorized number plates.

Deployment:

Deploy the system on the desired platform, whether it's on a local machine, cloud server, or edge device.

Testing and Evaluation:

Thoroughly test the system using different images and scenarios.

Evaluate the accuracy of vehicle detection and number plate recognition.

Use metrics like precision, recall, and F1-score to assess the system's performance.

Optimization:

Fine-tune and optimize the system for better performance.

Consider hardware acceleration for real-time processing if required.

Maintenance:

Regularly update the system to keep up with changes in vehicle designs, number plate formats, and OCR improvements.

Monitor and maintain the database and server infrastructure.

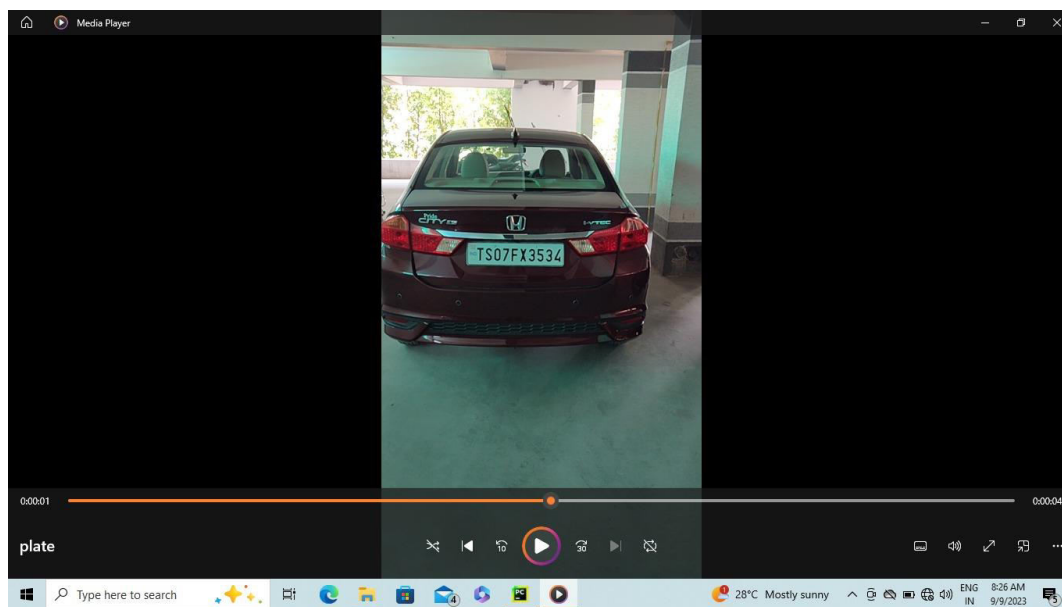
Security and Privacy:

Implement security measures to protect the system from unauthorized access.

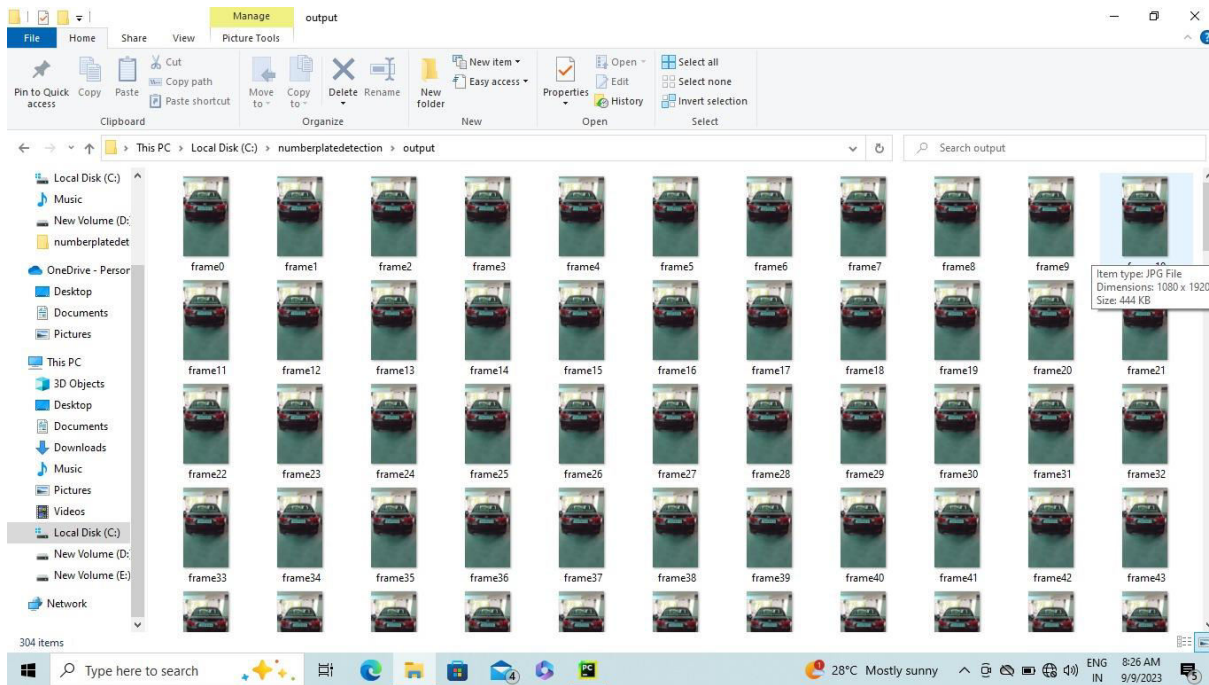
Ensure that privacy regulations are followed when handling sensitive data.

Remember that this is a high-level overview, and the specific implementation details will depend on your choice of tools, technologies, and programming languages. Additionally, real-time vehicle number plate detection systems may require optimizations for performance and efficiency.

5. RESULTS AND DISCUSSION SCREEN SHOTS



Input as video or image wisely:



Having input divide as a no. of Frames for reliable photo:

Output taken from input in a form of certain resolution with

(i) Black and white photo

(ii) Highlighted number plate photo



6.CONCLUSION AND SCOPE

CONCLUSION

In this project, we deal with the concepts of security of digital data communication across the network. This project is designed for combining the steganography and cryptography features factors for better performance. We performed a new steganography method and combined it with RSA algorithm. The data is hidden in the image so there will be no chances for the attacker to know that data is being hidden in the image. We performed our method on image by implementing a program written in Python language. The method proposed has proved successful in hiding various types of text, images, audio and videos in color images. We concluded that in our method the Image files and RSA are better. Because of their high capacity.

This work presents a Scheme that can transmit large quantities of secret information and provides secure communication between two private parties. Both steganography and cryptography can be woven in this scheme to make the detection more complicated. Any kind of text data can be employed as secret msg. The secret message employing the concept of steganography is sent over the network. In addition, the proposed procedure is simple and easy to implement.

The Embedding of data is done such as Audio, Video, Image is done in the image, by choosing a distinct and new image, we can prevent the chance for the attacker to detect the data being hidden. Results achieved indicate that our proposed method is encouraging in terms of security, and robustness.

7.REFERENCE

- [1] ANISH LAZRUS,SIDDHARTHA CHOUBEY,SINHA G.R.,"AN EFFICIENT METHOD OF VEHICLE NUMBER PLATE DETECTION AND RECOGNITION" Department of Computer Science, International Journal of Machine Intelligence, Volume 3, Issue 3.
- [2] Amninder Kaur, Sonika Jindal ,Richa Jindal "License Plate Recognition Using Support Vector Machine (SVM)" Dept. Of Computer Science, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 7.
- [3] Abhay Singh, Anand Kumar Gupta ,Anmol Singh, Anuj Gupta ,Sherish Johri, "VEHICLE NUMBER PLATE DETECTION USING IMAGE PROCESSING", Department of IT, Volume: 05 Issue: 03 | Mar-2018
- [4] Ganesh R. Jadhav, Kailash J. Karande, "Automatic Vehicle Number Plate Recognition for Vehicle Parking Management System", IISTE, Vol.5, No.11, 2014.
- [5] Mutua Simon Mandi ,Bernard Shibwabo, Kaibiru Mutua Raphael, "An Automatic Number Plate Recognition System for Car Park Management", International Journal of Computer Applications, Volume 175 – No.7, October 2017
- [6] https://en.wikipedia.org/wiki/Automatic_number-plate_recognition