Multiple Vehicles Monitoring and Security System

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Abstract: Automatic number-plate recognition (ANPR) is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data. It can use existing closed-circuit television, road-rule enforcement cameras, or cameras specifically designed for the task. Automatic number-plate recognition can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. This project describes the recognition of multiple number plates using several image processing and text recognition techniques. Our approach is to increase the accuracy of detection by considering all the frames for recognition that are converted from the input video file.

Keyword **– Python, Celery, Redis, Web sockets, OpenCV, Image Processing, Tesseract, OCR.**

I. INTRODUCTION

Vehicle plate detection and recognition appear in vast variety of applications, including travel time estimation, car counting on highways, traffic violations detection, and surveillance applications. Traffic monitoring cameras are mounted four to seven meters above the street level. Plate recognition range, where the cameras are able to capture the vehicles plates with sufficient resolution, starts from 20 to more than 50 meters away from the camera location. This range depends on the camera resolution and the lens mounted on the camera. At these heights and distances, vehicles plates are not as clearly visible as in other applications such as parking fee payment systems.

High camera installation point causes some difficulties against the correct detection of vehicles plates. Vehicles with dirty plates make the situation even more complicated. On the other hand, number plate is the only trustworthy identity of a vehicle in Intelligent Transportation Systems (ITS) and correct vehicle identification depends highly on the accuracy of automatic number plate recognition (ANPR) systems.

II. LITERATURE SURVEY

Title 1: Automatic Number Plate Recognition System Using Optical Character Recognition

This paper explains character recognition and how it enables the system to identify and convert the image into text form. Most of the number plate recognition algorithms use a single method for character recognition. After detecting license number plates, characters are further recognized. Implicit segmentation is also known as recognition-based segmentation. In this procedure segmentation and recognition of characters are achieved at the same time. The system examines the image into its elements. The implicit segmentation program is to split words into segments that should be characters, and then pass each segment to a classifier.

Title 2: Automatic Number Plate Recognition System (ANPR) (A Survey Article in International Journal of Computer Applications)

Hough Transform is a feature extraction technique initially used for line detection. Later on, it has been extended to find position of arbitrary shape like circle or oval. This is the basis OpenCV.

Image binarization is a process to convert an image to black and white. In this method, certain threshold is chosen to classify certain pixels as black and certain pixels as white. But the main problem is how to choose correct threshold value for particular image. Sometimes it becomes very difficult or impossible to select optimal threshold value. Adaptive Thresholding can be used to overcome this problem. A threshold can be selected by user manually or it can be selected by an algorithm automatically which is known as automatic thresholding. Edge detection is fundamental method for feature detection or feature extraction. In general case the result of applying edge detection of algorithm is an object boundary with connected curves. It becomes very difficult to apply this method to complex images as it might result with object boundary with not connected curves. Different edge detection algorithm / operators such as Canny, Canny-Deriche, Differential and Sobel are used for edge detection.

Title 3: Automatic Vehicle Number Plate Recognition Using Structured Elements

Vehicle Number Plate recognition carries a significant role in different applications for example traffic monitoring on highway, automatic toll fee, parking lots access control, identification of plundered vehicles etc. Automatic number plate recognition from the standard number plate is very easy to recognize. But it is very tough to identify if it has no standard size and pattern. This paper talks about the need to recognize the vehicle number accurately, which is mostly dependent on the character separation or isolation. So, all the characters from the image are separated without losing any element of a character.

Title 4: Automatic Number Plate Recognition System

This paper explains alternative solutions to pre-processing, image segmentation, character recognition and how the number plate can be located on a vehicle. The system of automatic number plate recognition faces many challenges. So, this step is essential to enhance the input image and making it more suitable for the next processing steps. The first step done in the preprocessing is to apply minimum filter to the image in order to enhance the dark values in the image by increasing their area. This is mainly done to make the characters and the plate edges bold, and to remove the effect of the light diagonal strips that appear in the characters.

Title 5: Automatic Number Plate Recognition (Abhishek Kashyap, B. Suresh, Anukul Patil, Saksham Sharma, Ankit Jaiswal. Electronics and Communication Engineering Department, Jaypee Institute of Information Technology)

This paper talks about adaptive thresholding, median filtering, feature extraction and contrast extension. Thresholding is done so as to create many binary images. Adaptive thresholding is a process in which a threshold value is calculated and then each pixel is compared with that constant (threshold) value and replaced with a pixel of black color if the value is less than the constant value or a white pixel if the value is greater than the constant value.

Median filter is used for removing the undesirable noises in the image. In this method a matrix of 3x3 is passed in the image. According the noise levels these dimensions can be adjusted. This process involves sorting of the entire pixel values orderly, and then replacing the pixel being considered with the median pixel value.

III. PREVIOUS SYSTEM

Previous system combines Sobel edge detection operator and soft-threshold wavelet de-noising to do edge detection on images which include White Gaussian noises. In recent years, a lot of edge detection methods are proposed. The commonly used methods which combine mean de-noising and Sobel operator or median filtering. This method is mainly used on the images which includes White Gaussian noises.

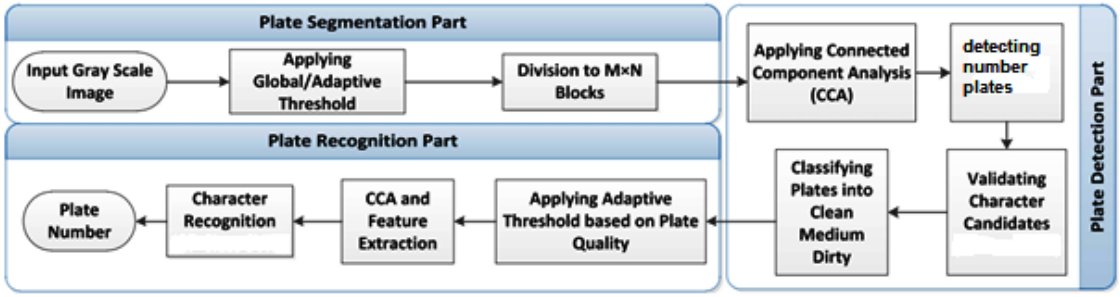

Fig 3.1 Previous System

IV. PROPOSED SYSTEM

4.1 System Architechture: A system architecture diagram would be used to show the relationship between different components. Usually they are created for systems which include hardware and software and these are represented in the diagram to show the interaction between them.

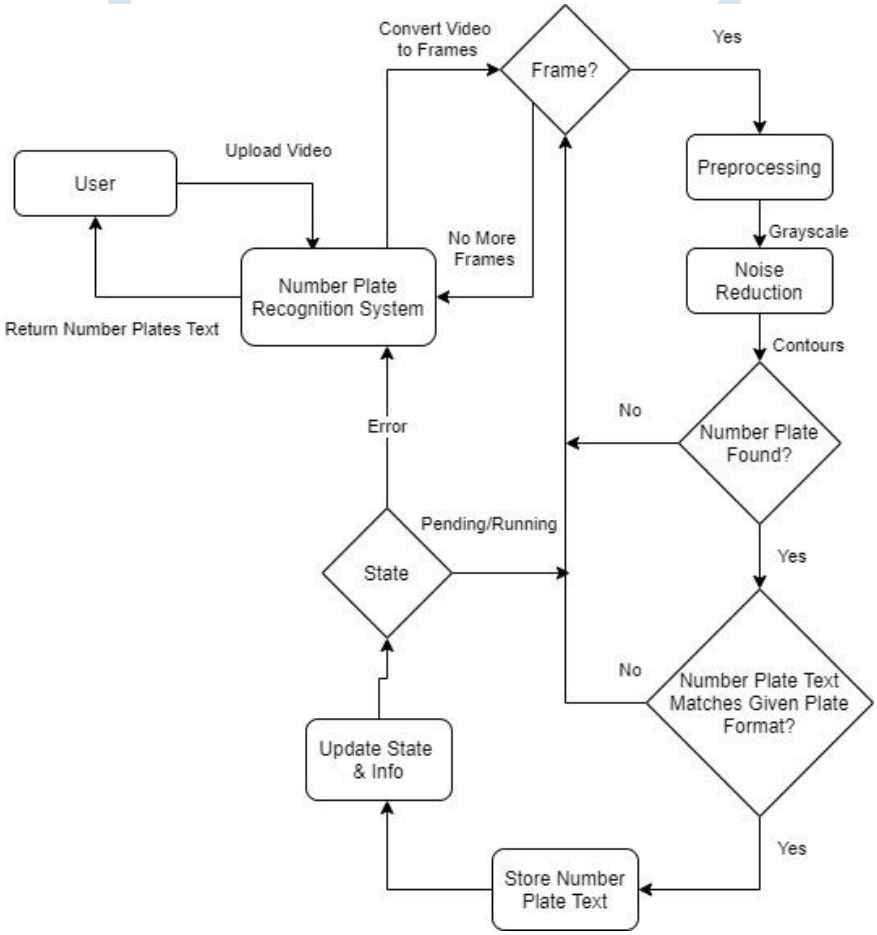

Fig 4.1 Proposed System Architecture

4.2 Data Flow Diagrams: A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated.

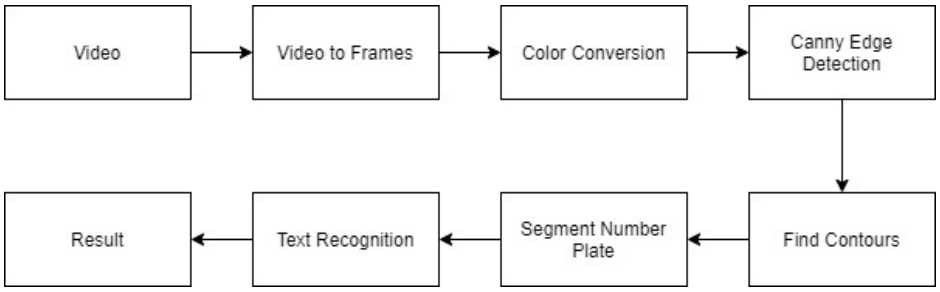

Fig 4.2.1 Data Flow Diagram

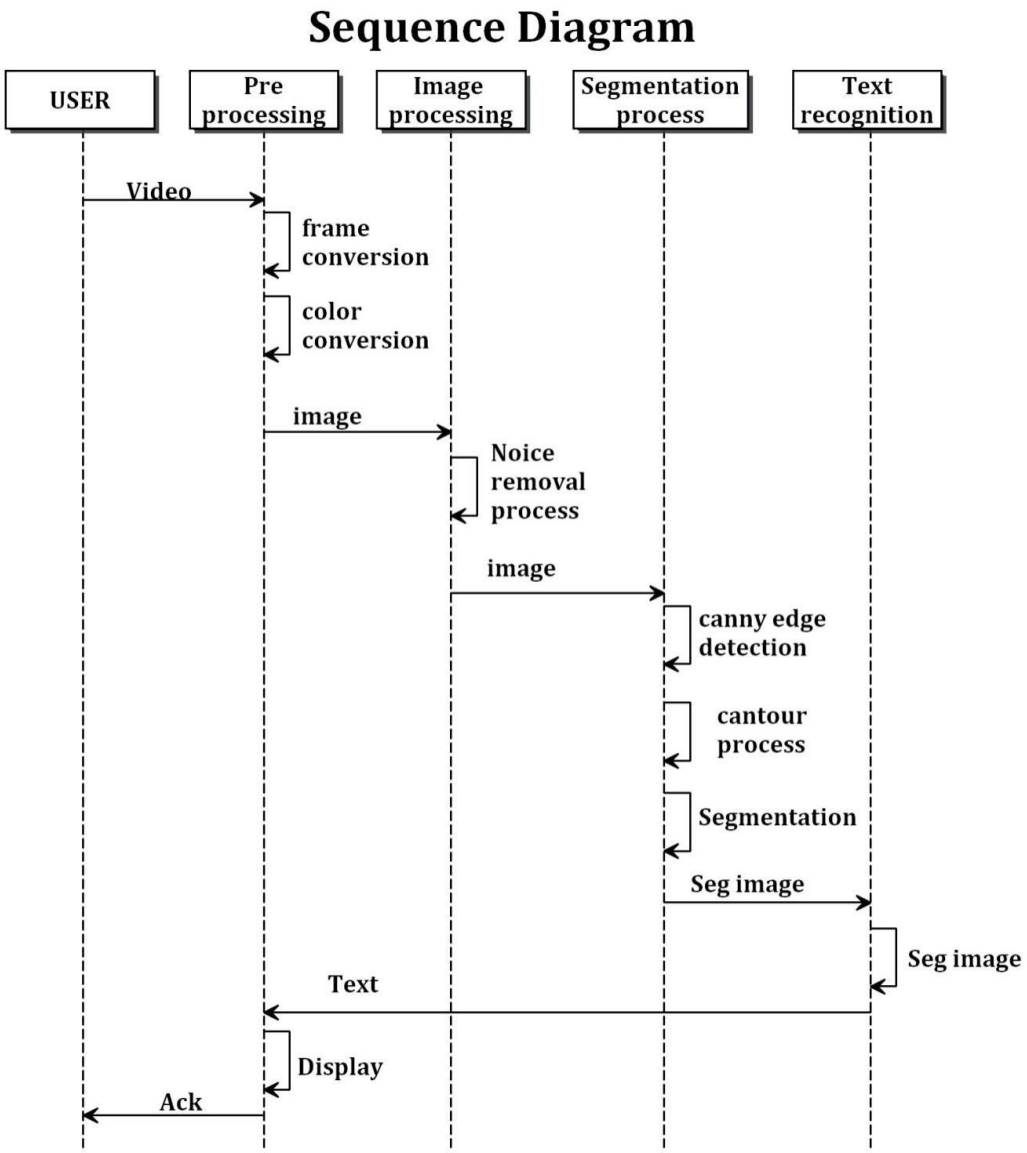

Fig 4.2.2 Sequence Diagram

4.3 Use Case Diagram: A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.

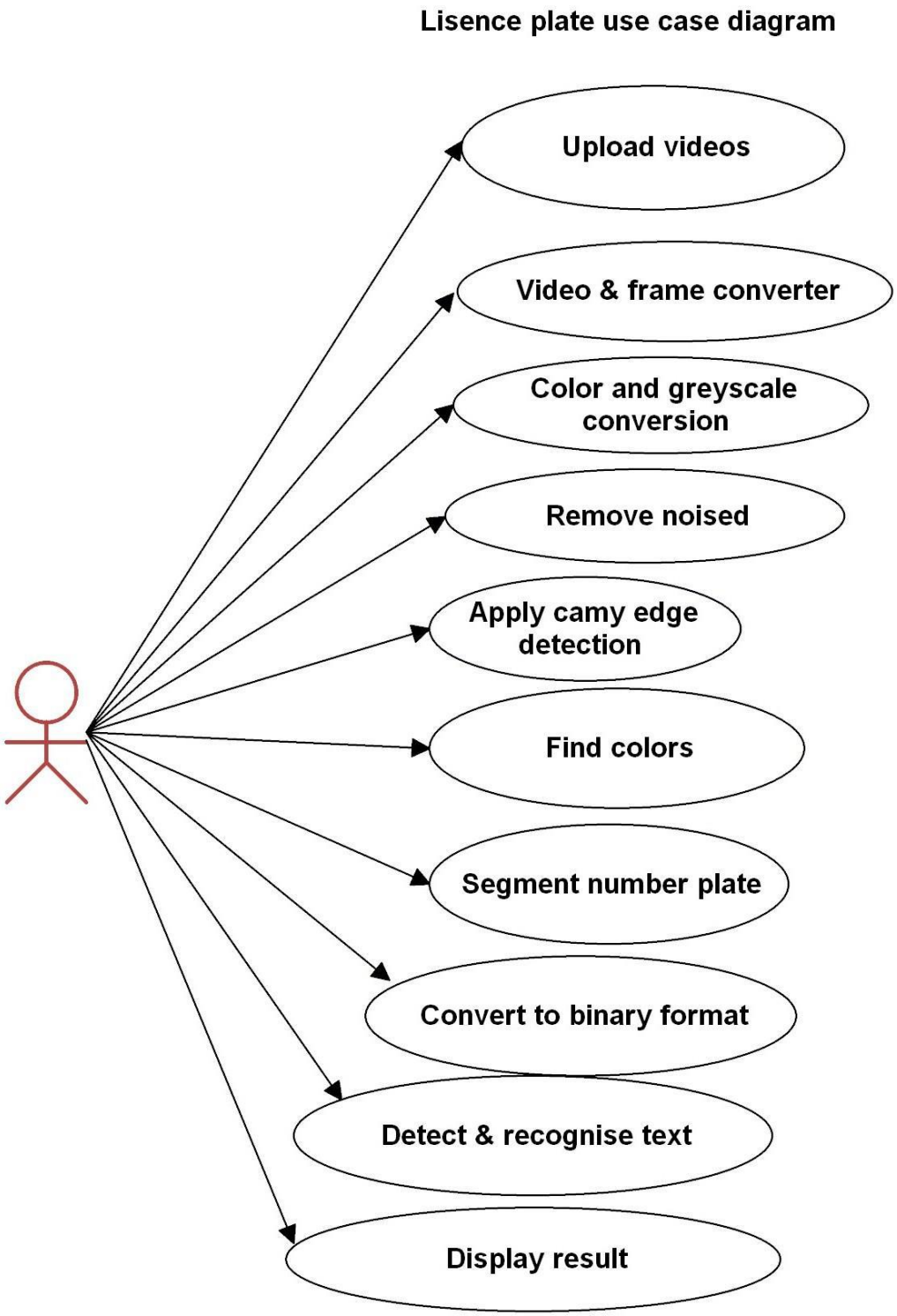

Fig 4.3 Use Case Diagram

V. TEST AND RESULTS

SUBJECT	VIDEO TO FRAME
INPUT	VIDEO FILE
EXPECTED	VIDEO FRAME
OUTPUT	AS EXPECTED
STATUS	PASS

Fig 5.1 Single Frame Extracted from Video

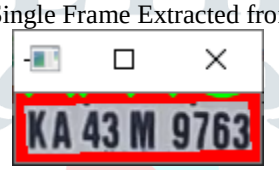

Fig 5.2 Number Plate Extracted from Frame

SUBJECT	FRAME PROCESSING
INPUT	VIDEO FRAME
EXPECTED	CHARACTER RECOGNIZATION
OUTPUT	AS EXPECTED
STATUS	PASS

Fig 5.3 Number Plate Detected from Video Frame

VI. Conclusion

ANPR plays a very important role in detecting the security threat and effective law enforcement of the country. As India is going through a phase of modernization and infrastructure development, it is very important to implement a reliable and accurate systems.

VII. Future Scope And Applications

- To build an ANPR system to process live videos.
- To build global ANPR solution & detect License plate with different languages.
- To reduce processing time by reducing the number of images processing.
- To build image based recognition.
- To detect non-standard Indian license plate.

VIII. Acknowledgement

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IX. References

- **Automatic Number Plate Recognition(2018)** Abhishek Kashyap, B. Suresh, Anukul Patil, Saksham Sharma, Ankit Jaiswal. Electronics and Communication Engineering Department , Jaypee Institute of Information Technology, Noida-201304, India
- **Automatic Vehicle Number Plate Recognition Using Structured Elements** Riazul Islam, Kazi Fatima Sharif and Satyen Biswas December 2015, Bandar Sunway, Malaysia
- **Automatic Number Plate Recognition System (ANPR):** Chirag Patel, Dipti Shah, PhD. Atul Patel, PhD A Survey International Journal of Computer Applications (0975 – 8887) Volume 69– No.9, May 2013
- **Automatic Number Plate Recognition System:** Amr Badr, Mohamed M. Abdelwahab, Ahmed M. Thabet, and Ahmed M. Abdelsadek
- **"Automatic Number Plate Recognition System Using Optical Character Recognition"**, Monika Arora, Anubha Jain , Shubham Rustagi , Tushar Yadav Assistant Professor, Department of I.T., Bhagwan Parshuram Institute of Technology, Delhi, India