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An Affordable Solution for Automatic Number Plate Recognition(ANPR) System for Indian License Plates.

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Abstract— *An approach for recognising the vehicle number plate is the Automatic Number Plate Recognition (ANPR) system. This method can be used in a variety of situations where there is no automated vehicle monitoring system, such as business complexes, residential society administrations, tolls, and parking spots. This problem is not limited to parking; it also raises security problems within those facilities. This problem can thus be automated by utilising a system that can read licence plates and store the data in a consistent, safe, and easily retrievable manner. Rather than retaining a manual book, all data entry can be done through web-forms, which would dramatically eliminate errors and ensure that the data is kept in its proper format.*
Index Terms— *Automation Number Plate Recognition, Block Diagram, Colour Space Conversion, License Plate, Moving Objects, Parking, Resident Page, Visitor Page,*

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I. INTRODUCTION

The main goal of this project is to create an automated system that may be used in residential communities to assure resident safety. The goal is also to learn about problem solving, the software development cycle, and computer vision techniques. Video detection of moving bodies One of the most used approaches for recognising moving objects in video is background removal. Basically, the background image is subtracted from the current image frame. The video camera captures three frames in this manner, and the frame difference between these frames yields the moving object of concern. Let's call these frames F1, F2, and F3, and the object will be obtained after executing the frame difference between them. Let Ct represent the current frame and but represent the background frame. The "AND" technique is used to obtain the final image frame (let's say Ft at any time t) that contains the moving object. The findings revealed that due to influences such as light illumination, unequal and varied light absorption can occur on the object. Background noise is formed as a result of this, which may impede image processing in the future. Mean and variance are also taken into account to minimise the image's background noise histogram. Nonetheless, there is still some noise in the visual frame. Noise comes in the form of randomness and superposition, and it degrades image quality. The median filtering approach is applied in this case. The following section describes a novel data fusion approach for recognising moving objects. Moving Object Detection (MOD) is a word that has become frequently utilised in domains such as security, which is a difficult criterion to meet due to factors such as environmental noise, lighting fluctuation, and background complexity. The section introduces an effective data fusion method for modelling this issue.

II. LITERAURE SURVEY

2.1- Detection of cars license plate from a single frame.

Mainly focusing on detection and recognition of multiple cars license plate from a single frame. Lp detection based upon combinations of mathematical morphology features and edge statistics produce high standard results. Edge based methods are not much used for complex images, for the reason that it is too sensitive to the unwanted edges. Mathematical morphology that is based on nonlinear neighborhood operations are used.

Image processing technique established on number plate recognition (NPR) system, to identify vehicles by applying neural networks and image co-relation. Extracting license plate from lacking brightness and less brightness image obtained recognition rate of 96.64%., detection is used to identify vehicles, using image co-relation and neural networks. Different novel approaches have been presented to improve the results. Pattern recognition are divided into two broad categories: recognizing abstract items and recognizing concrete items. They were used a multi- thresholding and neural pattern recognition (NPR) techniques combined with artificial neural networks. They obtained the recognition rate of 98.40%.

For plate detection, proposed several algorithms. Proposed canny edge-detection used based on optimization. The algorithm is based on clear and simple steps, six to be precise. Firstly read and resize the image, convert a gray scale image followed by complement of the image were received and the edges finded. Using filters image converted to small objects after that separate the image into objects. Finaly recognition the plate

2.2- Gray Scale Conversion

First change color image to gray scale image. License plate region contains large number of vertical edges which is the major feature of plate segmentation. In this step we remove the portions that don't contain any of the vertical edges. Before finding vertical edges remove all the noise.

This paper presents a successful and quick process for detecting multiple license plates. The advantage of our proposed method on multiple plates is its high accuracy in plate detection part. The proposed method detects multiple car number plates in single camera frame performed correctly.

2.3- Character recognition

The character recognition process of IOCR includes token extraction and character recognition involving pattern matching, spelling check and intelligent guessing as necessary. The last two techniques incorporated in the recognition process are one of the unique features of the system to enhance the recognition rate. The tokens of the characters of each word are first extracted from the digitised image of the text. Pattern matching is then used to select a set of probable characters for each token of a word. A character is chosen for each token to form the most probable word guided by the (occurrence frequencies of the characters and a dictionary.

This module extracts bit patterns for single tokens one by one from the image file. Hence the input to this module is an image file, while the output is bit patterns of tokens, line feeds, end-of-files, and spaces.

This module compares the extracted token patterns with the on-line reference patterns of a certain fonts and estimates the degrees of matching. A pattern is recognized if the degree of matching satisfies a minimum preset value. A set of characters, which satisfy the minimum value, is output for each token. The characters in the set are also ranked according to the degrees of matching.

Number plate recognition system systems have been implemented in many countries like Australia, Korea and few others. Strict implementation of license plate standards in these countries has helped the early development of ANPR systems. These systems use standard features of the license plates such as: dimensions of plate, border for the plate, color and font of characters, etc. help to localize the number plate easily and identify the license number of the vehicle. In India, number plate standards are rarely followed. Wide variations are found in terms of font types, script, size, placement and color of the number plates. In few cases, other unwanted decorations are present on the number plate. Also, unlike other countries, no special features are available on Indian number plates to ease their recognition process. Hence, currently only manual recording systems are used and number plate recognition system has not been commercially implemented in India

The spelling checks and the guess by features analysis have helped to improve the accuracy at the expenses of speed. Comparing with the feature extraction technique, the speed depends on the complexity of the symbol. But in our system, the speed depends on the print quality because a perfect text image will not invoke the spelling checker and feature analyser

The system works satisfactorily for wide variations in illumination conditions and different types of number plates commonly found in India. It is definitely a better alternative to the existing manual systems in India. Currently there are certain restrictions on parameters like speed of the vehicle, script on the number plate, skew in the image which can be aptly removed by enhancing the algorithms further.

III. CITATIONS

The final step is to recognise the characters from the plate that was located in the previous phase. This section offers a step-by-step breakdown of the processes involved in character recognition. The preliminary work consists of a general overview of the recognition process, followed by a skew detection and repair algorithm. The segmentation method is further explained, followed by an explanation of convolutional neural networks, which is required to comprehend the last paper, which is about Facebook's OCR.

The work shows the overall process of character recognition, which begins with pre-processing and continues through segmentation, training, and recognition. The grey scale conversion is done in the pre-processing module, followed by binary picture conversion. Because all channels contain the same data, the images are greyscaled. By turning pixels just into white and black, binarization helps to reduce processing requirements. The next step is segmentation, which involves extracting each individual character from the image. Line detection is followed by character detection in the segmentation process. Every row is verified for each pixel value in line detection, and lines are built using the values contained in the vector. The values are examined column by column for each line found above. The position of lines around the character is determined using the values supplied in the vector. Following segmentation, a module must be trained to recognise the characters obtained in the previous stage. The user types the characters, which are then turned into an image that is trained. The next module is to recognise the characters, which is accomplished by feature extraction, in which the key data from the image is extracted and saved in distinct classes. Each character has a distinct characteristic that aids in character recognition. Classification is used in conjunction with feature extraction to recognise each character and assign it to the appropriate class. The Kohonen Network is used in this project.

IV. CONCLUSION

Automatic number plate identification aids in the detection of security risks, which was formerly done manually. The system employs a number of image processing techniques, first recognising moving objects in video and then determining whether they are vehicles or not. If a vehicle is found, the number plate region is extracted, and character segmentation and identification are performed. The system is written in Python and its performance is evaluated using real-world footage. Additional optimization can be done to improve the system's accuracy. Recognizing the face of the person driving in order to boost security.

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