IMPLEMENTATION OF SMART GATE USING AUTOMATIC NUMBER PLATE RECOGNITION

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Abstract- Automatic Number Plate Recognition (ANPR) is an image processing technology which uses number plate to identify the vehicle. The objective is to design an efficient automatic authorized vehicle identification system using image processing to provide a secure area by using the vehicle number plate. The framework is actualized on the passageway for security control of an exceedingly confined territory like military zones or region around top government workplaces for example Parliament, Supreme Court. The developed system first detects the vehicle and then captures the vehicle image and it process that image and extract Vehicle number plate region, then the image segmentation is done. Optical character recognition technique is used for the character recognition. This method is independent on character size, thickness, illumination and is capable of handling plates from various countries. The subsequent information is then used to contrast and the records on a database in order to combine the particular data like the vehicle's proprietor, place of enlistment, address. The framework is actualized and recreated in MAT lab, and it execution is tried on genuine picture. It detects and recognize the vehicle number plate on real images and allows only the recognized vehicle.

Introduction:

Automatic Number Plate Recognition (ANPR) play an important role in various applications such as Traffic problems, highway toll collection, borders and custom security, premises where high security is needed, like Parliament, Legislative Assembly, and so on. ANPR techniques vary from one application to other application because of different working environments. Paintable cameras create dynamic scenes when they move, pan or zoom. A dynamic scene image may contain multiple number plates or no number plate at all. Moreover, when they do appear in an image, number plates may have arbitrary sizes, orientations and positions.If complex backgrounds are involved then detecting number plates can become quite a challenge. Number plate candidates are

determined based on the various models of Number plates. The models regarding number plate format include size, shape , textual design and various intensity values. They includes line blob the sign transition of gradient magnitudes, the aspect ratio of characters distributed between characters and the alignment of characters.The high challenging task is segmentation of text from badly degraded images because it has high intra/inter variation between the background and the foreground text of various number plate images. In this paper, we propose an image binarisation technique that detects the issues by using median filter. Template matching algorithm is used for number plate recognition. The algorithm takes an input image of the number plate and after filtering the image by using median filter, it performs region based operations. After, that it tries to capture the characters regions in a processed binary image and with the template matching outputs the string of number plate characters. This method is simple, robust, and involves minimum parameter tuning

Literature survey:

In this system license plate recognition depending on vehicle type and province. Color segmentation is applied to separate features based on colors. The proposed system can successfully detecting and isolating moving objects from video f rame image[1]. This paper approach for detecting vehicle in urban traffic areas by means of rule based reasoning on visual data. Template matching technique is used to recognize. The experimental results prove that integration between the reasoning module and the image analysis techniques

provides system with flexibility and robustness[2]. Day by day the use of vehicle in our lie is rapidly increasing for any vehicles to be acknowledge vehicle license plate detection plays a significant role in this active world. First all the character are segmented and recognition by using pattern matching method at last template matching method is used with the use of correlation for recognition of each characters in the number plate[3]. From the study and analysis of test after applying images on database the normalised cross correlation method was found more accurate to recognize the number plate segmentation algorithm and morphological operations were performed[4].In this paper we propose an automatic and mechanised license and number plate recognition system which can extract the license plate number of vehicles passing through a given location using image processing algorithm. This system can be used for security and traffic control[5]. This paper presents the training based approach for the recognition of vehicle number plate. The process has divided into three stages capturing the image plate localization and recognition of digits over the plate. Support vector machine is employed for classification purpose yielding more accuracy while recognition [6].Significant research and development of algorithm in the intelligent transportation has grabbed more attention in recent years. An automatic fast accurate and robust vehicle plate recognition system has become need for traffic control. This paper is dedicated and an improvement technique of OCR based license plate recognition using neural network trained dataset of object

features. The system is less time complexity and high adaptable[7].

Proposed system:

This paper is on the development of new approaches for extraction of license plates. In this proposal, the proposed algorithm is based on extraction of plate region, segmentation of plate characters. Extraction of plate is a difficult task. In this approach, a simple license plate extraction method is presented. The method is fundamentally based on the morphological algorithms and connected components analysis, including four major stages, which are, RGB to gray-scale conversion, image binarization and filtration, analysis and dilation, and then finally extracting the accurate location of the license plate. Vehicle's number/license plate is segmented from the background using the combination of filtering, thresholding and morphological operations. The background portions are completely removed and the number plate characters alone segmented successfully with high accuracy. Based on the measurement of shape features such as Area, we are classifying the different license plates. The matching process with the already stored template is also done. Finally it classifies the number plate belongs to registered vehicle or unregistered vehicle. The proposed method is simple and robust.

The method comprises the following major stages, which are: RGB to gray-scale conversion, vertical edge detection and image binarization, analysis and dilation, vertical projection and thresholding, extracting the accurate location of the license plate, filtration and image

enhancement, binarization and smoothing process, and Character segmentation in horizontal and vertical direction of the image.
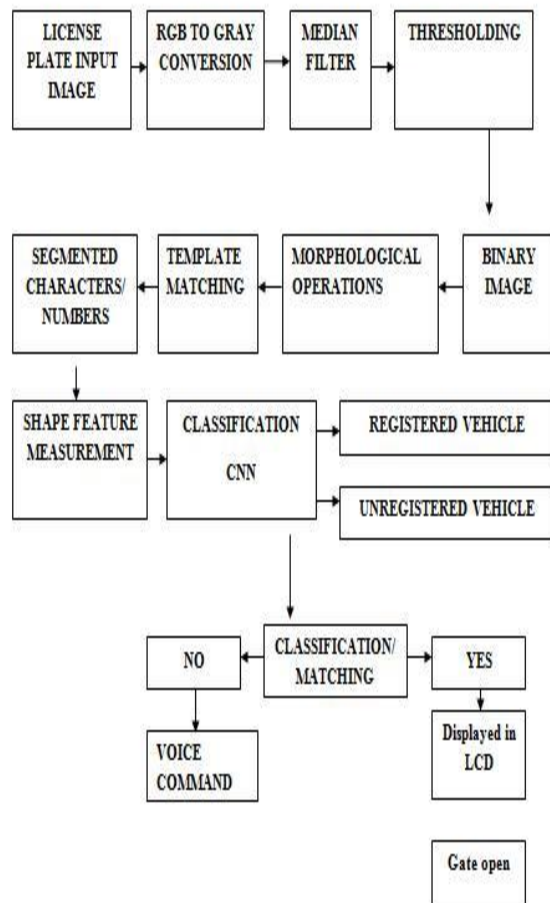
The proposed method is simple and robust. The simulation output will be interfaced with the hardware via serial cable. The MAX-232 IC receives the command from the PC and pass to microcontroller. The microcontroller present in the hardware kit controls the entire kit. If it gets matched, the License plate characters and the owner details will be displayed in the LCD; The toll gate setup will be opened and closed. If doesn't get matched, It will display as Unregistered vehicle and buzzer sound will

start to ring, which act as the indicator for toll booth officers.

CNN :

The pattern recognition approaches discussed so far are based on direct computation through machines. Direct computations are based on math-related techniques and discusses bionics related concepts in recognizing patterns. An artificial neural network is an interconnected group of nodes, akin to the vaste the data .

A CNN consists of an input and an output layer, as well as multiple hidden layers. The hidden layers of a CNN typically consist of convolutional layers, pooling layers, fully connected layers and normalization layers. Description of the process as a convolution in neural networks is by convention. Mathematically it is a cross-correlation rather than a convolution. This only has significance for the indices in the matrix, and thus which weights are placed at which index. A convolutional neural network (CNN) is one of the most popular algorithms for deep learning, a type of machine learning in which a model learns to perform classification tasks directly from images, video, text, or sound. CNNs are particularly useful for finding patterns in images to recognize objects, faces, and scenes. They learn directly from image data, using patterns to classify images and eliminating the need for manual feature extraction. Applications that call for object recognition and computer vision such as self-driving vehicles and face-recognition applications rely heavily on CNNs. Depending on your application, you can

build a CNN from scratch, or use a pre trained model with your dataset.

A convolutional neural network can have tens or hundreds of layers that each learn to detect different features of an image. Filters are applied to each training image at different resolutions, and the output of each convolved image is used as the input to the next layer. The filters can start as very simple features, such as brightness and edges, and increase in complexity to features that uniquely define the object. Like other neural networks, a CNN is composed of an input layer, an output layer, and many hidden layers in between.
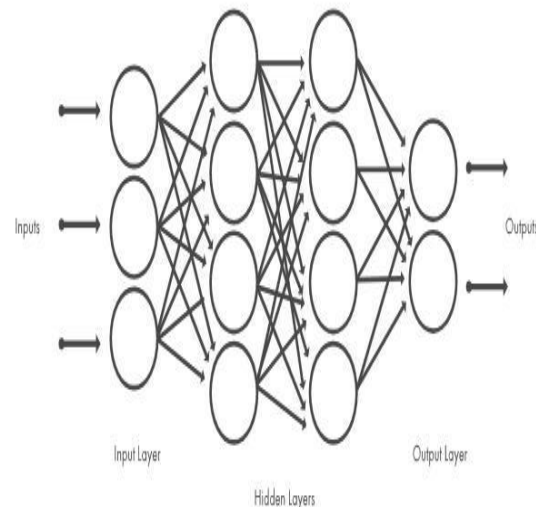

These layers perform operations that alter the data with the intent of learning features specific to the data. Three of the most common layers are: convolution, activation or ReLU, and pooling.

Convolution puts the input images through a set of convolutional filters, each of which activates certain features from the images.

Rectified linear unit (ReLU) allows for faster and more effective training by mapping negative values to zero and maintaining positive values. This is sometimes referred to as activation, because only the activated features are carried forward into the next layer.

Pooling simplifies the output by performing nonlinear down sampling, reducing the number of parameters that the network needs to learn.These operations are repeated over tens or hundreds of layers, with each layer learning to identify different features. After learning features in many layers, the architecture of a CNN shifts to classification. The next-to-last layer is a fully connected layer that outputs a vector of K dimensions where K is the number of classes that the network will be able to predict. This vector contains the probabilities for each class of any image being classified. The final layer of the CNN architecture uses a classification layer such as soft max to provide the classification output.

Experimental result:
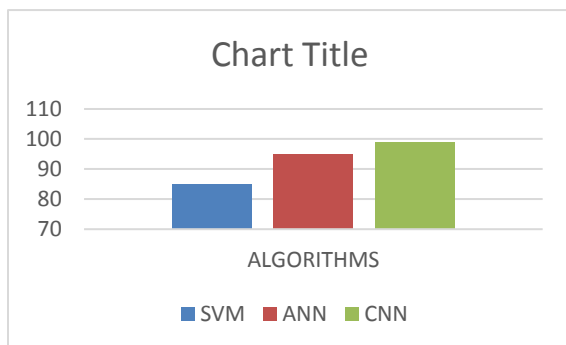
By comparing the existing algorithms, such as SVM gives 85% of accuracy and then ANN gives 92% of accuracy. Finally our proposed algorithm CNN gives 98% of accuracy above all

Comparison table

SVM	TARINED IMAGES 30	85%
ANN	TRAINED IMAGES 40	90%
CNN	TRAINED IMAGES 50	98.5%

Conclusion:

This paper is on the development of new approaches for extraction of license plates. In this paper, we proposed the image binarization technique that addresses these issues by using filtering and thresholding. Vehicle's number/license plate is segmented from the background using the combination of filtering, thresholding and morphological operations. The background portions are completely removed and the number plate characters alone segmented successfully with high accuracy. Based on the measurement of shape features such as Area, we are classifying the different license plates. The matching process with the already stored template is also done. Finally it classifies the number plate belongs to registered vehicle or unregistered vehicle. The proposed method is simple and robust. The simulation output will be interfaced with the hardware via serial cable. The MAX-232 IC receives the command from the PC and pass to microcontroller. The microcontroller present in the hardware kit controls the entire kit. If it gets matched, the License plate characters and the owner details will be displayed in the LCD. The toll gate setup will be opened and closed. If

doesn't get matched, It will display as Unregistered vehicle and buzzer sound will start to ring, which act as the indicator for toll booth officers.

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