REAL TIME VEHICLE NUMBER PLATE RECOGNITION

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Abstract—Automatic number plate recognition (ANPR) is an image processing technology which uses number (license) plate to identify the vehicle. The developed system first detects the vehicle and then captures the vehicle image. Vehicle number plate region is extracted using the image segmentation in an image. ANPR 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, colour and font of characters, etc. Help to localize the number plate easily and identify the license number of the vehicle. Wide variations are found in terms of font types, script, size, placement and colour of the number plates. Hence, currently only manual recording systems are used and ANPR has not been commercially implemented in India. CNN model was used to train the images and to detect number plate.

Index Terms—Number Plate Recognition

I. INTRODUCTION

Automatic number plate recognition (ANPR) plays an important role in numerous applications such as unattended parking lots security control of restricted areas traffic law enforcement congestion pricing and automatic toll collection. Due to different working environments, LPR techniques vary from application to application. Most previous works have in some way restricted their working conditions, such as limiting them to indoor scenes, stationary backgrounds fixed illumination, prescribed drive ways limited vehicle speeds or designated ranges of the distance between camera and vehicle.

II. LITERATURE SURVEY

Research involves analyzing the solutions proposed by others and find out the shortcomings of the proposed systems to put forward a better solution to the problem. To overcome the problems in marking the better accuracy, the approach used was based on automatic number plate recognition where the main task is to find the better accuracy with those available in the dataset.


This research presents a prosperous method to identify vehicle number plates. The proposed technique is built on morphological operations based on different structuring elements in order to maximally exclude non-interested region and improve object area. This system has been experienced using a database of number plates and simulated results demonstrate major improvements as compared to other conventional systems.

Muhammad Tahir Qadri, Muhammad Asif “Automatic Number Plate Recognition System for Vehicle Identification using Optical Character Recognition” IEEE 2009

The system is implemented on the entrance for security control of a highly restricted area like military zones or area around top government offices. e.g. Parliament, Supreme Court etc. The developed system first detects the vehicle and then captures the vehicle image. Vehicle number plate region is extracted using the image segmentation in an image. Optical character recognition technique is used for the character recognition. The resulting data is then used to compare with the records on a database so as to come up with the specific information Character Recognition. The objective is to design an efficient automatic authorized vehicle identification system by using the vehicle like the vehicle’s owner, place of registration, address etc.

III. EXISTING SYSTEM

ANPR 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, colour and font of characters etc. Help to localize the number plate easily and identify the license number of the vehicle. Wide variations are found in terms of font types, script, size, placement and colour of the number plates. Hence, currently only manual recording systems are used and ANPR has not been commercially implemented in India.

IV. PROPOSED SYSTEM

This project is on the development of new approaches for extraction of license plates. The proposed algorithm is based on image acquisition, extraction of plate region, segmentation of plate characters 10 and recognition of characters. Extraction of plate is difficult task. In this project, a simple license plate extraction method is presented.
The method is basically based on the Edge Detection algorithm including four major stages, which are RGB to gray-scale conversion, Gaussian Blurring, morphological operations and extracting the accurate location of the license plate. Mean squared error method is used for recognition of characters.

**CONVOLUTION LAYER:**
Detected license plate in the input image. Extracted number plate after detecting the plate. The majority of computations happen in the convolutional layer, which is the core building block of a CNN. Process of convolution involves a kernel or filter inside this layer moving across the receptive fields of the image, checking if a feature is present in the image. After each iteration a dot product is calculated between the input pixels and the filter. The final output from the series of dots is known as a feature map or convolved feature.

**POOLING LAYER:**
The characters are segmented in the number plate. Like the convolutional layer, the pooling layer also sweeps a kernel or filter across the input image. But unlike the convolutional layer, the pooling layer reduces the number of parameters in the input and also results in some information loss. On the positive side, this layer reduces complexity and improves the efficiency of the CNN.

**FULLY CONNECTED LAYER:**
The segmented characters are recognized using the ocr detection model. The FC layer is where image classification happens in the CNN based on the features extracted in the previous layers. Here, fully connected means that all the inputs or nodes from one layer are connected to every activation unit or node of the next layer. It also would increase losses and affect the output quality, and it would be computationally expensive.

**Process of the Model:**

An image of the vehicle’s license plate is captured using camera. The image can be captured by a stationary camera or a mobile camera that moves around to capture image of different vehicles. The captured image is preprocessed to enhance its quality. Image preprocessing includes tasks such as image resizing, normalization, and noise reduction. The is goal is to prepare the image for further analysis. In Number plate detection, the CNN algorithm is used to detect the location of the number plate in the image. The algorithm analyses the features of the image to identify the boundaries of the number plate. After number plate detected, the next step is to segment the individual characters in the number plate that is called character segmentation. The CNN algorithm is used to identify the characters in number plate and separate them from each other. Finally, the recognized characters are displayed as the
output of the ANPR (automatic number plate recognition) system. The output can be used in various purposes, such as toll collection, parking management, and law enforcement.

**Vehicle Number plate recognition from the image:**

**Preprocessing:**
Preprocessing on a number plate typically involves a series of image processing techniques, making it easier to recognize the characters on the plate.

Number plate detection:
License plate detection is the process of locating and identifying license plates in an image or video frame. It involves identifying the region of the image where the license plate is located and extracting it for further processing, such as character recognition or vehicle identification.

Number plate segmentation and character recognition:
Number plate segmentation is the process of identifying the individual characters or digits on a license plate. The OCR software compares to a database of known license plate to identify the vehicle and display it.

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Vehicle number plate recognition from webcam:

Results:

Automatic number plate recognition system detects the number plate with 92% by using CNN algorithm.

V. CONCLUSION

ANPR applications are becoming increasingly complex in Indian context with the phenomenal exponential growth in car, two-wheeler and auto Industries. ANPR applications like automatic toll collection, automatic charging system in parking spaces, management vehicles in parking spaces, and traffic monitoring, etc., have posed new research tasks in ANPR with newer dimensions. We have developed a software for automatic license plate recognition by taking inputs from live video feed. Character segmentation has been implemented on extracted number plates. Finally, segmented characters are recognized by using mean squared error method.

REFERENCES