A study and Analysis of Advanced Re-recognition for Automobiles Using Machine Learning

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Abstract : The Advanced re-recognition of automobiles is a mass surveillance method that uses optical character recognition on images to read the license plates on vehicles. They can implement the existing television or cameras to monitor the activity. This application is used for traffic police and toll gate people to monitor the violent activity of the people and they can able to take a image and make compliant. Advanced re-recognition of automobiles 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. Systems commonly use infrared lighting to permit the camera to require the image at any time of the day. Advanced re-recognition of automobiles technology tends to be region-specific, owing to plate variation from place to place. Many identification techniques are implemented for number plate identification and they are utilizing in many traffic activity and other security applications till now, all the LPR systems are developed using neural networks. In this work proposes to implement the system using Gabor filter, OCR and Vision Assistant to form the system faster and more efficient. The application uses Machine Learning concept to work and generate the data or details of the vehicle using number plate. The main aim of using the concept of machine learning is to implement KNN algorithm. This algorithm process in three steps name-plate isolation, character segmentation and OCR reading of characters of the vehicle plate.

Keywords: Infrared lighting, LPR systems, Gabor filter, OCR and Vision Assistant, Machine Learning.

1.INTRODUCTION

The vehicles growing in number these days have led a serious problem to find a particular vehicle therefore Advanced Re-Recognition of Automobile includes the technology which can read images of vehicle number plates using three main technologies namely number plate isolation here the number plate is recognised from the image, character segmentation here each character is classified into bits and read then lastly OCR which is known as optical character recognition, this technology provides vehicle data on the basis of its number plate. This technology uses various cameras such as closed circuit television, road-rule traffic cameras,or high-authority cameras specially designed to perform such as traffic cameras to record images of the vehicle. Advanced Re-Recognition of automobiles is the application or process which is used by police forces around the nation to maintain peace and also record the traffic violations done by the people. It can also be used by the

electronic toll collections or pay-per-use roads. The technology also uses infrared rays to capture images at any time of the day that is to capture images even after the sun set. The result of number plate identification is processed accurately using the concept of machine learning and KNN algorithm.The idea of reading or identification of vehicle number plate was developed in 1976 at the police scientific development branch in Britain. However, the application was not much widely used in various countries until newly developed applications which were easy and cheap to use software came into existence in 1990's. Later people use to make documents separately for the data collected by the automatic number plate identification in 2000's. The data was not stored simultaneously into the database therefore once the details were obtained through the number plate the data was separately stored either manually or through the record. Therefore, this documented data was used by the police department to solve the crime cases. The first murder case which was solved using this documented data was during 2005. This technology is commonly implemented in any one among two basic approaches:firstly, it helps to process the preformation of entire real time lane location, and secondly transmitting various different images from many lane location to the remote computer locations and then perform process of OCR whenever required for the future purpose. Therefore, there are huge number of computers used as a server to perform or carry workloads in bulk such has maintaining the data of many hundreds of vehicles or maintaining the data of entire nations vehicles. The application works by pre-processingusing median filter approach, later extracting the number plate from the image and then finally the image is read and result is computed accurately using KNN algorithm.

CRIME DEPARTMENT MODULE: This module is completely handled by the crime department of the police station. Here the crime department member must register himself in order to get his login details. once logged in for the security issues the crime department member must perform his verification by entering the OTP sent to his registered email id. only once the OTP is verified the crime department member is allowed to access the other functions of the module. The other functions of the module are:

- Upload image: here the crime department member uploads the image of the vehicle
- Update crime: here the crime department member updates or notes the crime committed by the vehicle.

The application works mainly using the three functions namely:

- Image isolation
- Character segmentation
- OCR

Image isolation: According to this, once the number plate is captured of a vehicle, then the image is added to the application for pre-processing, here from the entire image the number plate will be recognised based on the characteristics and features.

Character recognition: According to this, once the number plate of the vehicle is identified from the image then the characters of the number plate are separated, each character here is separated and read as the individual bits.

OCR: OCR is also called as optical character Recognition technique this is a technology which is widely used for the purpose of translating the scanned images to its appropriate machine encoded text. Therefore, here the number plate of the vehicle will be scanned

- upgrading them by adapting to

2.LITERATURE SURVEY

From many years there has been an interesting attempt among the researchers to find a solution for extracting a text or data for the image. Therefore, much intensively the research was carried out with several technical papers to develop an application that can identify and getdata from licence plate.

Later days the method for recognising number plate automatically was based on ARM-DSP which is also called as arithmetic capability of digital signal processors was proposed by Zoë Jeffrey, Xiaojun Zhai et al. This method was made as frequently choosed for the use of embedded systems due to its high frequency execution and the interfaces with multiple peripherals of ARM processors. DSP is one such technology which is already been use in the processing of audio, video, image and wireless signal processing. Practically the application includes the following: surveillance, image encoding and decoding, tracking of object and image detection. To consider on

the other hand, the computations on digital signal processing can be done at the low cost using the alternative technology called as Field Programmable Gate Arrays(FPGA). Therefore, the applications related to image recognition uses these technologies i.e., ARM, DSP and FPGA because of the power offered for processing by them to provide probability, real-time compatibility and also useful in customising the embedded architectures based on the requirements. The goal of these technologies is to provide efficient and effective way of designing the best architecture for automatic number plate recognition system which can operate on both high definition and real time. Later on the another algorithm was designed and optimised for the recognition of number plate by considering the advantage of technical features of FPGAs which are used to generate image processing algorithms. The study and research on this algorithm denotes its optimization focused on real time image and also image processing for license plate or number plate recognition, number plate character segmentation and also optical character recognition these are considered as the three key stages of automatic number plate recognition. This system is included as a part of an intelligent transportation system. The main applications of the system include identifying vehicles by their number plates for crime detection, control access and toll collection.

Mike Constant provided the maximum length of distance for zooming lens, which is used to identify the vehicle number plate. The distance may vary from 100 meters to 300 meters in some

cases. One of the common guideline which can be suggested is that to capture the vehicles

Number plate of the vehicle must be 50% height from the screen height. Therefore, the height of the vehicle can be assumed as 1.5 meters and the size of the lens as 7.5 to 75 mm.

Therefore, will be the scenario to detect the number plate of the moving vehicle, for such situation Michael Lidenbaum et al, has developed algorithm. One such prototype system was developed by him which can be able to recognise licence plate. The recognition of number will be carried out in real-time, looking at cars passing at the

3.IMPLEMENTATION

KNN algorithm is also called as K nearest neighbor algorithm. This algorithm helps in producing the effective output of the application by predicting the values based upon the testing data and the training data. KNN use both classification and regression approach.

In Advanced Re-recognition of automobiles, the KNN algorithm is used to recognise the pattern of image based on the font, numeric and alphanumeric characters and also store and read the charactersin bits to retrieve the data stored according to that image

How does a KNN algorithm work?

Step1- Calculate Similarity based on distance function

There are many distance formulas to calculate the distance between the similar o and find the k closest element among them the most commonly used formula to

measure the distance is Euclidean distance formula, this formula is mostly used to check for the continuous data and another common formula which can be used to measure the distance among the continuous data is Manhattan distance formula

Step 2- find K-Nearest Neighbors

Consider K as any number. Then the algorithm searches for the number of elements you have assumed which are closest to the

Euclidean formula:$d(x,y) = \sqrt{\sum_{i=1}^{m}(x_i - y_i)^2}$
Manhattan formula:$d(x,y) = \sum_{i=0}^{m}|x_i - y_i|$

result i.e. it will consider various measures to check the similarity among the assumed number and the result and then display the element as a result which has more similarities.

Pros and cons of KNN Algorithm:

Pros:

- The algorithm is easy to understand
- It has no assumptions about the data
- The KNN algorithm can be applied to both classification and regression
- The algorithm works effectively and easily on multi class problems

Cons:

- It is hard to calculate when there are high number of independent variables
- The algorithm is sensitive to scale of data

web browsers like chrome, Mozilla etc.

- The web pages of advanced re recognition is described using mark-up language.
- The HTML is used to create the building blocks of designing web page in Advanced re recognition of automobiles.
- It was very easy and user friendly to develop advanced re recognition of automobiles using various tags.
- The attractive output of web pages are produced using html and also and are easily executed and are interacted by the end user in the browsers

The another important and advanced feature of designing web pages used by the application advanced re recognition of automobiles is CSS. With the help of CSS much attractive and effective web pages are created. CSS ease the work of developing an application by putting all things together in one page and save it with the extension .css.

Why CSS is used in advanced re recognition of automobiles?The use of CSS is considered as time saving. Almost all the web pages of the application advanced re recognition of automobiles are developed using this concept therefor much effective and interactive images were created.

- The use of CSS is said load the pages faster. Therefore, in application advanced re recognition of automobiles only once the CSS code is written and applied the same to all pages which executes it faster
- The use of CSS in advanced re recognition of automobiles makes the application much easier to maintain and implement.
- The use of CSS in advanced re

recognition of automobiles helps the to create much attractive web pages.

- The application advanced re recognition of automobiles is said to be multiple device compatibility due to the use of CSS. There are various features of CSS which makes the system compatible with multiple devices which means various versions of websites can be easily created using CSS
- The other reason for the use of CSS is, it is considered as the global web standard. It highly recommended to use CSS instead of other web designing tools in order to create much attractive, effective and interactive web pages

4. METHODOLOGY:

Step 1:

The data is collected from the image source;therefore, the first step of the application is the analysis of the data. The number plates are collected from various sources such as RTO and crime department, this data is initially pre-processed by applying dataset from a set of data collection and also the data is prepared known as data preparation.

Step 2:

The next step for the development of creating a model using machine learning approach using the concept of KNN for advanced re recognition of automobiles is to deploy the algorithm in the application. The KNN algorithm and its concepts are applied in the application advanced re recognition of automobiles. The details of the number plate are

effectively retrieved using KNN algorithm.

Step 3:

Later the third step of the application is to train and experiment on the datasets retrieved. The data is obtained from the from the dataset using accurate predictions and confusion matrix.

Step 4:

The final step of the application is deploying and analysis the application Advanced re recognition of automobiles in the real life scenario. The model developed using the trained and tested predictions will be deployed in the real life scenario. Once after deployed according to user desires the application will be modified.

5.RESULTS & ANALYSIS :

Here the RTO employee needs to register himself by filling the correct details in the provided textboxes.the details of the employee will be stored in the database called RTO

RTO welcome page:

Here the RTO employee can choose the option to add vehicle details, view vehicle details are logout.
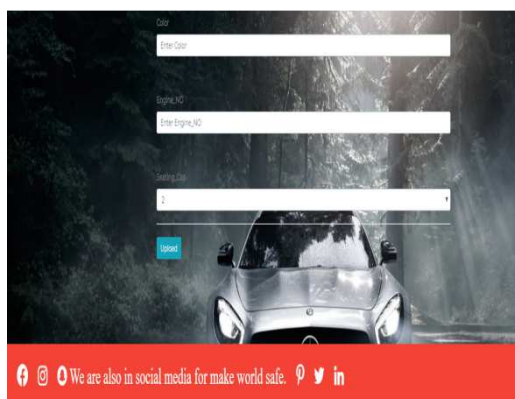

View vehicle details:

Here the details of the vehicle are viewed at once.

Add vehicle details:

here the RTO Employee will add the vehicle details in the given textboxes.

6.CONCLUSION

Advanced Re-recognition of Automobiles is successfully implemented using all the requirements, this app is created only for the official purpose. This application is user friendly that it can be easily operated by the RTO and the Crime department. The RTO employee from his end can easily add the details of new vehicle into the database which can be used by the crime department member for the future purpose.

The Advanced Re-recognition of automobile has made easy to the crime department member to add or update the crime of the vehicle immediately by uploading the image on spot. This image helps the crime department member to retrieve the details of particular vehicle from the RTO database.

Once the crime is updated it is easy for the RTO employee to also view the crime update made by the crime department member. Also it shares the report of the crime details to the particular person who has committed crime via email.

Therefore I conclude, the application is very easy and user friendly to operate from both the ends that is RTO and the crime department.

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