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AUTOMATIC CHALLAN GENERATION

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Abstract:

Now-a-days, traffic is increasing at rapid rate. In most of the cities and small towns the traffic Challan generation is manual process. The traffic police officer has to focus on violations like whether the person is wearing the helmet or not, drunk & driving, illegal parking and driving on wrong side. These all things will cause burden to the police officer. In order to reduce the burden of the police officer we are doing this project Automatic Challan Generation . We are implementing Automatic Challan Generation in Deep learning for traffic violation by mainly focusing on whether the people are wearing the helmet or not. In this Automatic Challan Generation, the methodology that we follow is at first we are going to train the model by giving some images which contain pictures of the persons who are wearing a helmet and not wearing a helmet. This Automatic Challan Generation model predicts whether a person going on the road has kept the helmet or not. If a person is not wearing a helmet, then the system predicts the person and challan will be generated for that person.

Keywords: Convolution Neural Network, Deep Learning, Automatic challan Generation, Helmet,

1. INTRODUCTION

In many cities and small regions, the traffic Challan generation system is a manual process. The Automatic Challan Generation for the traffic violation is a Deep Learning(CNN) based project that will automatically detect the violating vehicles and accurately punish them. This project is designing to reduce the work of traffic police officers so that they can focus on other violations like illegal parking, driving on the wrong side and drunk driving. This project will work to reduce the violations and make the city a better and safe place for pedestrians and vehicles. The need for automation comes from the growing number of vehicles on the road every day. It has become an impossible task for traffic police officers to watch and control every road and every vehicle. It is up to human beings to maintain discipline but in a densely populated country like India patience runs thin and forces the people to break the law. In this Automatic Challan Generation, the methodology that we follow is at first we are going to train the model by giving some images which contain pictures of the persons who are wearing a helmet and not wearing a helmet. This AutomaticChallan Generation model predicts whether a person going on the road has kept the helmet or not. If a person is not wearing a helmet, then the system predicts the person and challan will be generated for that person. For this we have used Convolution Neural Networks.

2.LITERATUREREVIEW

In the paper of Shiv Kumar Goel, Dr.Manoj Kumar Shukla discussed the ever-increasing rate of the traffic rule violation and the e-penalty measures that could be adapted to strengthen the enforcement of road and traffic safety. All this gave us the motivation to design a penalty system that will force the violator not to repeat their mistake. The key area of this system is to identify the person who is not wearing the helmet and penalizethem.Chiverton et al.[7] depicted and tried a framework for automatic classification of cruisers with and without a helmet. It has utilized (SVM) Support Vector Machine which is prepared of (HOG) Histogram of Oriented Gradients which is gotten from thehead district of the static pictures and individual picture outline from video information. By this technique the accuracy rate was high however the quantity of testing pictures taken wasless.

Chiu et al. [9] it has utilized a PC vision- based framework that intends to distinguish and section cruisers somewhat blocked by another vehicle. A Helmet detection framework was utilized in which the nearness of helmet improves that there is a cruiser. Right now recognize the helmet, edges were registered of the conceivable helmet locale.

Silva et al. [10] proposed a framework for detection of the helmet which first beginnings with moving item division utilizing descriptors and afterward detection of helmet following the (ROI) Region of intrigue which is the head locale at that point groups among helmet and no-helmet. However, the downside was that it utilizes circle Hough transform to order among helmet and non-helmet which additionally prompts misclassification among head and helmet as both have a round shape and it is computationally costly.

3.METHODOLOGY

3.1.1 Image Classification:

Image classification is a supervised learning problem: define a set of target classes (objects toidentify in images), and train a model to recognize them using labeled example photos. Earlycomputer vision models relied on raw pixel data as the input to the model. However, a raw pixel dataalone doesn't provide a sufficiently stable representation to encompass the myriad variations of anobject as captured in an image. The position of the object, background behind the object, ambientlighting, camera angle, and camera focus all can produce fluctuation in raw pixel data; thesedifferences are significant enough that they cannot be corrected for by taking weighted averages ofpixel RGB values.

3.1.2 Convolution Neural Network:

For developing the system certain methodologies have been used. The methodology used in this project is image classification using CNN.

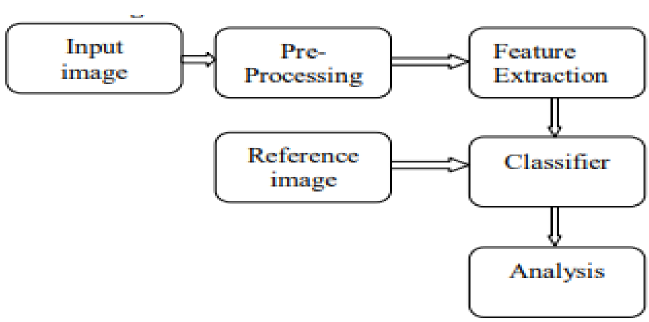

Fig 1: Architecture

The CNN have two components:

1**) Feature extraction part:** features are detected when network performs a series of convolutional and pooling operation.

2) **Classification part:** extracted features are given to fully connected layer which acts as classifier.

Step1—CollectingtheDataset

we need a huge amount of information to train our model, with the goal that our model can gain from them by recognizing out specific relations and regular highlights identified with the items.

For our project we gathered the pictures from different locales. We gathered the dataset of pictures of the individuals wearing helmets and without helmets dataset which comprisesof500images—250ofeach.

This will help in training just as testing our classifier.

Folder Structure:

Approximately 80% of the images formed the training dataset and the remaining 20% formed the validation dataset. The images collected were put into the respective dataset folder and subfolders corresponding to the species name. The subfolder name defined the label that would be applied to each image.

Step2 : Importing LibrariesandSplitting the Dataset

First, we have to import the libraries to utilize the powers of the libraries.

In the wake of bringing in the libraries, we have to part our information into two sections - taining_set and test_set.

For our situation, the dataset is as of now split into two sections. The training set has400 pictures every one of helmets and without helmets, while the test set has 50 pictures of each.

Step 3 : Building the CNN

This is the most significant step for our network.

It consists of three parts -

1. Convolution
2. Polling
3. Flattening

Convolution Layer:

In convolution operation input image is convolved with the Feature detector or filter to form a feature map. By applying convolution the size of the image is reduced but still the important features are extracted.The output of this layer is Convolution matrix.

MaxPooling Layer:

Pooling in CNN is used mainly for **– Dimension Reduction**: In deep learning when we train a model, because of excessive data size the model can take huge amount of time for training. Spatial Invariance can be reduced

Flattening

In flattening multi dimensional pooled feature map is converted into single dimension.Each feature is formed as a single neuron.

Step 4 : Full Connection

The Full connection is interfacing our convolutional system to a neural system and afterward incorporating our system.Here we made 2 neural systems with sigmoid function as an activation function for the last layer as we have to discover the likelihood of the item being a helmet or without a helmet.

Compiling the model :

Next, we have to gather our model. Gathering the model takes three parameters: optimizer, loss andmetrics.

- The optimizer controls the learning rate. We will utilize 'adam' as our optimizer. Adam is commonly a decent optimizer to use for some cases. The adam optimizer alters the learning rate all through thetraining.
- We will utilize 'binary_crossentropy' for our loss function. This is the most widely recognized decision for characterization. A lower score shows that the model is performingbetter.

Step5—DataAugmentation

Data augmentation is a way we can diminish over-fitting on models, where we increment the measure of training data utilizing data just in our training data. The field of data augmentation isn't new, and truth be told, different data augmentation methods have been applied to explicitissues.

Step6—TrainingourNetwork

In this way, we finished all the means of development and it's a great opportunity to train our model. On the off chance that you are training with a decent video card with enough RAM (like a Nvidia GeForce GTX 980 Ti or better), this will be done in under 60 minutes. On the off chance that you are training with an ordinary CPU, it may take significantlymore.Withan expanding numberof epochs, the precision will increment.

Step7—Testing

Presently we should testan arbitrary image.

Also, yes !! our system effectively anticipatedthe picture of the person!! Despite the fact that it isn't 100% exact it will giverightexpectationsmore often than not. Have a go at including moreconvolutional and pooling layers, play with the quantity of nodes and epochs, and you may get high precision results. You can even try it with your image and see what it predicts. Whether you look close to a helmet or a without ahelmet.

4.RESULTS ANDDISCUSSIONS

Here the proposed system collects data using web cameras in different angles and positions to build the system to produce goodaccuracy.If the image is found then the accuracy is predicted and also indexes are displayed as 0 or 1 based on the image given from either test_set or train_set, if the image is not found it shows “shape notfound”.The below diagram shows TKInker predicting that the person is wearing the helmet.After opening the image in the TKInker, it predicts whether the person is wearing a helmet or not.

Fig 2: predicting the image of the person wearing a helmet

The below diagram shows TKInker predicting that the person is not wearing the helmet.After opening the image in the TKInker, it predicts whether the person is wearing a helmet or not.

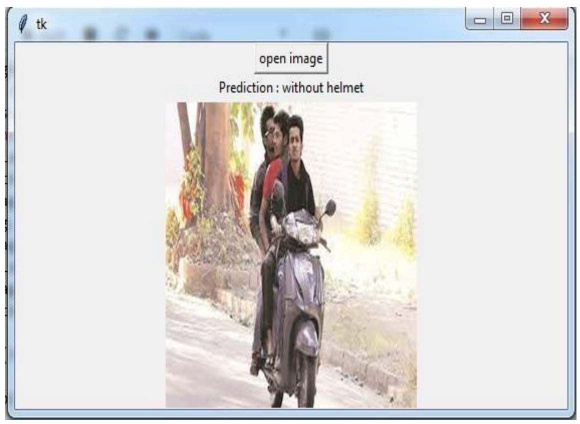

Fig 3: predicting the image of the person not wearing a helmet

Here, TensorFlow is used which is adaptive, powerful and visualizing. By using CNN, we succeeded in reaching a robust accuracy compared with otheralgorithms.

Discussions:

CNN is an powerful algorithm that is broadly utilized for picture arrangement and item location. The progressive structure and ground-breaking highlight extraction abilitiesfrom a picture makeCNN an exceptionally vigorous algorithm for different picture and item recognition undertakings.

5.CONCLUSION

The current examination explored a technique to distinguish whether the person is wearinga helmet or notutilizing a profound learning algorithm on the dataset for characterizationof the picture.The generated system is connected with a user- friendly website where the user will upload photos for identificationpurposes and itgivesthe desiredoutput. The proposed system works on the principle-based on the detection of a part and extractingCNN features from multiple convolutional layers. Thesefeaturesare aggregatedand then givento theclassifierfor classification purposes. Based on the results which have been produced, the system has provided the 90%accuracy in prediction of finding whether the person is wearing a helmet or not.

6. FUTURE SCOPE

Up-to now we are manually collecting images from different sources and gave those images as input to our model. Our model will predict whether the person wears the helmet or not. But there is a future scope where collecting the images directly from the CC cameras and training the model to predict the exact output. And also we only did for helmet detection, In future we can implement this for all traffic violations . So that this can help the government in such a way that they can accurately generate the challan's those who violate the rules.

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