TRAFFIC SIGN RECOGNITION USING DEEP LEARNING

[1]T. Venkata sumanth, [2]D. Vinod Reddy, [3]P. Leela Balaji, [4]Kanhaiya Kumar

[1,2,3,4]UG Scholar,
Dept. of ECE
Audisankara Institute of Technology, Gudur

***Abstract*- Traffic Sign Recognition (TSR) describes the characteristics and requirements and also difficulties between the road sign identification and recognition of the road signs. It shows the convolutional neural network technique used for the verification and classification of road signs. The paper introduces a traffic sign detection and recognition system that accurately estimates the situation and exact boundary of traffic signs using a convolutional neural network (CNN). during this Python project, we'll build a deep neural network model which will classify traffic signs present within the image into different categories. With this model, we are ready to read and understand traffic signs, which is a really important task for all autonomous vehicles.**

***Keywords*- Traffic Sign Recognition (TSR), convolutional neural networks (CNN), Deep learning**

INTRODUCTION

Traffic sign detection may be a major crisis in intelligent vehicles, traffic sign recognition provides critical information like directions and alerts in autonomous driving or driver assistance systems. you all have heard about self-driving cars during which the passenger can fully depend upon the car for travelling. But to realize level 5 autonomy, it's necessary for vehicles to know and follow all traffic rules. In the world of AI and advancement in technologies, many researchers and large companies like Tesla, Uber, Google, Mercedes-Benz, Toyota, Ford, Audi, etc. are performing on autonomous vehicles and self-driving cars. So, for achieving accuracy with this technology, the vehicles should be ready to interpret traffic signs and make decisions accordingly.

When you go on the road, you see various traffic signs like traffic signals, turn left or right, speed limits, no passing of heavy vehicles, no entry, children crossing, etc., that you need to follow for a safe drive. Likewise, autonomous vehicles also have to interpret these signs and make decisions to achieve accuracy. The methodology of recognizing which class a traffic sign belongs to is called Traffic signs classification. In this Deep Learning project, we will build a model for the classification of traffic signs available in the image into many categories using a convolutional neural network (CNN) and Keras library.

PROPOSED SYSTEM

In this project, we make a CNN block where predictions are directly performed across multiple feature levels. For this project, we are using the general public dataset available at Kaggle i.e. ITSRD(Indian traffic sign dataset)

Step 1: Explore the dataset Our 'train' folders contain 50 folders each representing a special class. The range of the folder is from 0,1,2, up to 49. With the assistance of the OS module, we iterate over all the classes and append images and their respective labels within the data and labels

Step 2: Build a CNN model To classify the pictures into their respective categories, we'll build a CNN model (Convolutional Neural Network). CNN is best for image classification purposes.

Step 3: Train and validate the model After building the model architecture, we then teach the model using model.fit().

Step 4: Test our model with the test dataset Our dataset contains a test folder and during a test.csv file, we've the small print associated with the image path and their respective class labels.

Now we are getting to build a graphical interface for our traffic signs classifier with Tkinter. Tkinter is nothing but a GUI toolkit within the standard Python library. Here we upload the pictures and classify the image.

METHODOLOGY

In this project, we'll develop this using Python. We are getting to develop a model which can detect the traffic sign. We build a deep neural network model which will identify which traffic sign is present in there in the image. We also used the PIL library to open image content into an array. Our dataset contains a train folder which carries folders each representing different classes and in the test folder we have the small print associated with the image path and their respective class labels

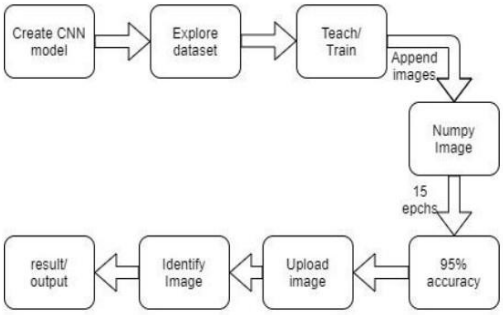


FIGURE SYSTEM ARCHITECTURE

Convolution neural network algorithm may be a multilayer perceptron that's the special design for the identification of two-dimensional image information.

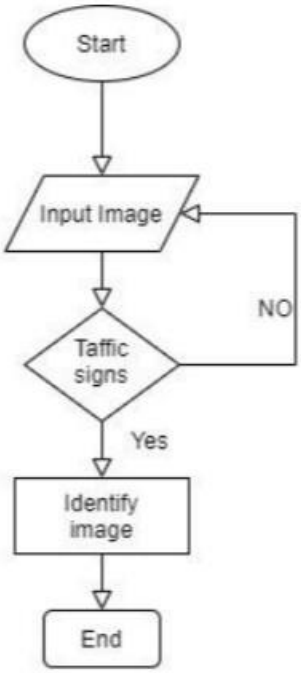


FIGURE FLOWCHART

RESULTS

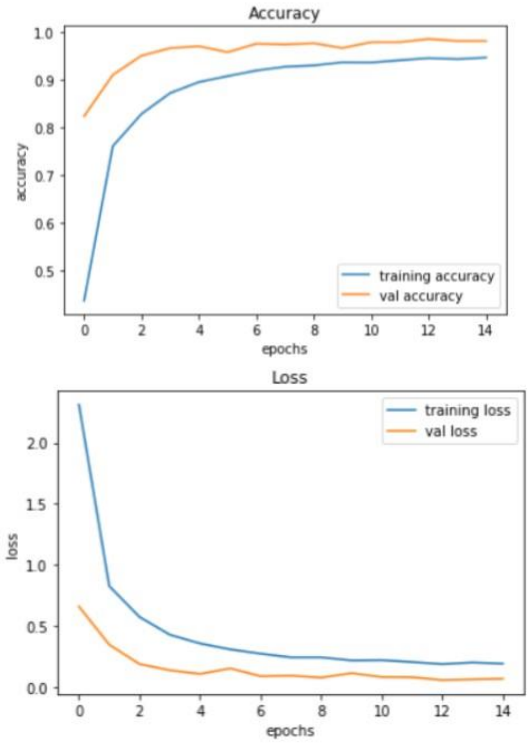
In this Python project, we've successfully classified the traffic signs classifier with 95% accuracy and also visualized how our accuracy and loss change with time, which is pretty good from an easy CNN model

In the above figure, we update a traffic sign image as shown in fig. **After** clicking on classify image button it shows the output of the traffic sign.

As we can see that there is a speed limit (20km/h) sign, as soon as the car detects and recognize the traffic sign, accordingly Informs the driver about the speed limit if a driver is over speeding.

And above traffic sign shows that there are children crossing on the road so vehicles go slowly.

These are some graphical representations of training accuracy and value accuracy



CONCLUSION

In this paper, we proposed an efficient traffic sign recognition method. to the present end, we generalized the traffic sign templates with precise boundaries and high accuracy. To achieve practical detection speed, we explored the best-performing convolutional neural network for both detection & recognition considering the characteristics of traffic signs. By using the images of traffic signs, our method effectively utilizes strong information about target shapes to the drivers.

REFERENCES:

[1] M. Lalonde and Y. Li, "Road sign recognition – survey of the state of the art," Centre de recherche informatique du Montreal, Tech. Rep. CRIM-IIT-95/09-35, 1995.

[2] S. Estable, J. Schick, F. Stein, R. Janssen, R. Ott, W. Ritter, and Y.- J. Zheng, "A real-time traffic sign recognition system," in Proc. IEEE Intelligent Vehicles '94 Symposium, 1994, pp. 213–218.

[3] V. Rehrmann, R. Lakmann, and L. Priese, "A parallel system for real-time traffic sign recognition," in International Workshop **on** Advanced Parallel Processing Technologies '95 (APPT), 1995, pp. 72–78.

[4] C. Bahlmann, Y. Zhu, V. Ramesh, M. Pellkofer, and T. Koehler, "A system for traffic sign detection, tracking, and recognition using colour, shape, and motion information," in Proc. IEEE Intelligent Vehicles 2005 Symposium, 2005, pp. 255–260.

[5] H. Ishida, T. Takahashi, I. Ide, Y. Mekada, and H. Murase, "Identification of degraded traffic sign symbols by a generative learning method," in Proc. 18th Int. Conf. Pattern Recognition (ICPR 2006), vol. 1, 2006, pp. 531–534.

[6] P. Siegmann, R. J. Lopez-Sastre, P. Gil-Jim ´ enez, S. Lafuente-Arroyo, and ´ S. Maldonado-Bascon, "Fundaments in luminance and retro reflectivity ´ measurements of vertical traffic signs using a color digital camera," IEEE Transactions on Instrumentation and Measurement, vol. 57, no. 3, pp. 607–615, 2008.

[7] A. Broggi, P. Cerri, P. Medici, P. P. Porta, and G. Ghisio, "Real-time road signs recognition," in Proc. IEEE Intelligent Vehicles 2007 Symposium, 2007, pp. 981–986. [8] A. de la Escalera, J. M

[8] A. de la Escalera, J. M. Armignol, and M. Mata, "Traffic sign recognition and analysis for intelligent vehicles," Image and Vision Computing, vol. 21, no. 3, pp. 247–258.

[9] X. Gao, K. Hong, P. Passmore, L. Podladchikova, and D. Shaposhnikov, "Colour vision model-based approach for segmentation of traffic signs," EURASIP Journal on Image and Video Processing, vol. 2008, pp. 1–7.

[10] U. L. Jau, C. S. Teh, and G. W. Ng, "A comparison of rgb and hsi color segmentation in real-time video images: A preliminary study on road sign detection," in Proc. Int. Symp. Information Technology ITSim 2008, vol. 4, 2008, pp. 1–6.