

DECLARATION

I, **Sanjay N M (38110499) & Sarvesh S (38110505)** hereby declare that the Project Report entitled "**CNN ALGORITHM TO DETECT TRAFFIC SIGNS**" done by me under the guidance of Dr S Dhamodaran Ph.D., ME (Internal) is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering / Technology degree in **Computer Science and Engineering**.

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

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ABSTRACT

Traffic sign detection and recognition has always been a concern as it has many applications in the near future. One of the most important being autonomous cars etc. this project is to use convolutional neural network algorithms to train the model with a data set of different traffic signs, test and validate with a high accuracy rating. This is a basic step which is to come. It can be used for highway maintenance. driver support exercises and more. The given data set has 43 different classes. The model's accuracy for a given class is around 99(average) percent for signs that have a minimum of 500 images or more. The accuracy relatively drops to 80(avg) percent as the number of images drops to 100 or less. The reason for this is that the epochs(iterations) run are Ten. As the given data set is relatively huge the iterations take hours to train. The CNN algorithm is best for such images such as symbols as it trains a huge number of images before testing and putting in the grayscale feature makes it more efficient. This system can be introduced in people's daily life as it can save people from giving warnings to people about the traffic signs. This can be introduced in every vehicle just like the parking assistance that has been introduced in today's vehicles.

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CHAPTER – 1

INTRODUCTION

1.1. OUTLINE:

This project is used to traffic sign detection and recognition since it has received an increasing interest in the previous years and up to come. This is due to the wide range of applications that a system with this capability can provide driving assistance, highway maintenance, driver support systems and intelligent autonomous vehicles.

We use Convolutional Neural Network system to make the machine learn the traffic sign to use the given data set and learn the different traffic signs and live track the signs.

CNN is the best algorithm when it comes to tracking static images and has an accuracy above 90 percent.

1.2. MODEL IDE:

Jupyter Notebook (formerly IPython Notebooks) is a web-based interactive computational environment for creating Jupyter notebook documents. The IDE was installed in Anaconda, an open-source distribution for the languages Python and R used to perform Data Science and Machine Learning. The IDE's UI in which the model was developed is given.

1.3. PROBLEM STATEMENT:

Traffic signs are an important part of road rules. This is a type of language that is spoken on roads. This is meant to read by people but is ignored by most people. Thus making the automobiles to read it by themselves

1.4. OBJECTIVE:

The usage of vehicles in every country has increased exponentially. Every person is starting to own a car of their own thus increasing the road traffic and more issues such as accidents.

As an example, in India 2020 there has been around 3.75 lakh accidental deaths according to NCRB data. This can be reduced significantly if people can follow the road signs and follow the rules accordingly.

Thus the given system uses computer vision to detect and recognize road signs with high accuracy. This is achieved by using python and deep learning, The algorithm used in particular is convolution neural network.

We use different libraries of python such as Tensor Flow and Open CV to achieve this. Thus reducing tragedies and creating new opportunities in this branch

CHAPTER – 2

LITERATURE SURVEY

In the years gone by, research on the topic of exploiting machine learning and deep learning algorithms to classify Traffic signs and advance them to the next steps of autonomous cars.

Liwei Jia, Xiaoming Shi

Traffic sign detection (TSD) and traffic sign classification (TSC) constitute a complete recognition system. The paper mainly studies the traffic sign recognition. Traffic sign recognition is mostly applied to portable devices, so the size and detection speed of the model are important factors to be considered. Under the condition of ensuring the speed, the detection accuracy of the model is guaranteed. (2020)

Template Matching is a high-level machine vision technique that identifies the parts on an image that match a predefined template. Advanced template matching algorithms allow to find occurrences of the template regardless of their orientation and local brightness.

It uses Template matching. the first disadvantage is that you need to know what you're looking for. template matching provided by OpenCV doesn't let you check for rotations and scaling

Sharifah Maryam Alhabshee, Abu Ubaidah Bin Shamsudin

In this paper, a deep learning method is used to make a system for traffic sign recognition. You Only Look Once (YOLOv3) is used as it has a quick response in terms of real-time data reliability followed by high accuracy and robust performance. This study applies image preprocessing for better decision making for the recognition system. (2020).

it's incredibly fast and can process 45 frames per second. YOLO also understands generalized object representation. This is one of the best algorithms for object detection and has shown a comparatively.

Struggles to detect close objects because each grid can propose only bounding boxers. Struggles to detect small objects. Due to high speed high error rates.

Zhilong Hei, Zhongjun Xiao

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The accuracy of the model designed in this paper on the German traffic sign recognition benchmark (GTSRB) is 99.30%. The parameter size is only 1.3M, and the trained network model is 4.0M.

The number of classifiers used are less. This can lead to lot of clashes between similar signs

S Jayanthi Sree, A Surya Prakash

The proposed technique makes use of Gabor based kernel followed by a normal convolution kernel after the pooling layer. The optimizer technique used here is the Adams method. Hue, Saturation Value color space features have a speed of detection is faster and low suffering from illumination.. (2021).

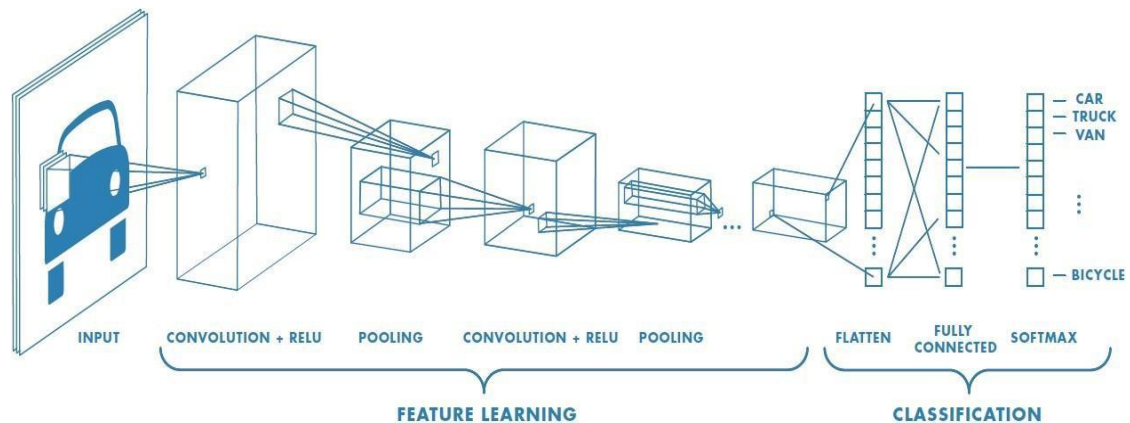
The advantage of Gabor filters over Gaussian derivatives is related to a higher flexibility in the definition of the function shape, because of a more general set of features.

Challenge of Gabor technique is it has high redundancy of features.It uses RGB to detect classify symbols which causes more complications

3.3 CONVOLUTION NEURAL NETWORK:

Artificial Intelligence has been witnessing a monumental growth in bridging the gap between the capabilities of humans and machines. Researchers and enthusiasts alike, work on numerous aspects of the field to make amazing things happen. One of many such areas is the domain of Computer Vision.

The agenda for this field is to enable machines to view the world as humans do, perceive it in a similar manner and even use the knowledge for a multitude of tasks such as Image & Video recognition, Image Analysis & Classification, Media Recreation, Recommendation Systems, Natural Language Processing, etc. The advancements in Computer Vision with Deep Learning has been constructed and perfected with time, primarily over one particular algorithm — a Convolutional Neural Network.



Process Outline

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.

The architecture of a ConvNet is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field. A collection of such fields overlap to cover the entire visual area