

## AUTOMATED TRAFFIC SIGN DETECTION USING CNN

Durgesh Bangude\*<sup>1</sup>, Ankit Pachurkar\*<sup>2</sup>, Ankit Raut\*<sup>3</sup>,

Amay Singh\*<sup>4</sup>, Priya Khune\*<sup>5</sup>

<sup>\*1,2,3,4</sup>SPPU, Engineering, PVPIT, Pune, Maharashtra, India.

<sup>\*5</sup>Prof., Department of Computer Engineering, PVPIT, Pune, Maharashtra, India.

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### ABSTRACT

The detection and recognition of road signs is one of the most popular subjects of computer vision and image processing over past few years. They play an important part in independent driving and traffic safety. Traffic regulations are a major concern when we have a look at the increasing number of vehicles. An increase in vehicles directly has an impact on the rate of accidents. Nowadays traffic signs are overlooked by people and they do not follow traffic regulation this can lead to many accidents. The goal of this project is to make the driver aware of these traffic signs and prevent accidents that may be caused. This project proposes a system that will detect and classify different types of traffic signs from images in real world and inform the user with voice instruction about the traffic sign. The number of signs used in this project for classification is 43, which are commonly used in India. Convolutional Neural Networks have been used for detection and recognition purpose. Image Augmentation is used to magnify and clean the image, thus helping to identify the traffic sign.

**Keywords:** Convolutional Neural Network, Image Processing, Machine Learning, Image Augmentation, Deep Learning.

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### I. INTRODUCTION

With the world trending towards technology and with the increase in population there has been a significant rise in the use of vehicles, especially cars. Even though there are traffic regulations in the country, the traffic regulations are not followed up to the mark. Many people do not follow the traffic rules sincerely. As a result of this there are accidents taking place every day on a large scale. With the ever increasing accidents and with the traffic rules not being followed there is a need for a system that alerts the drivers about the traffic signs. People simply avoid the traffic signs and end up creating problems not only for themselves but also for people who are not at fault. The system proposed helps the user to identify the traffic signs and in turn to follow traffic rules. It informs the driver about the real time traffic signs and relays what the traffic sign indicates in voice instructions. Our proposed system aims to reduce these accidents and ensure the safety of the driver as well.

### II. METHODOLOGY

The project works on a principle of image processing which done with the help of CNN. We will first import the image dataset. This dataset will include 43 types of image classes that will help to identify the image captured by the camera. Then we will do image augmentation and we will clean those images. Then we will train our CNN model which will help to identify what type of image is captured by camera (refer fig.1). After that we will convert our CNN model result into a pickle object. The pickle object is used to convert the result into byte stream which will be easy to access while using real time identification of images. Now, the camera will capture real time traffic images while the user is driving. These images will again be augmented, cleaned and then used for comparing with our trained dataset. Now, our model will compare the captured images with the dataset and identify the class of that image and according to the class the image belongs to it will instruct the driver with the respective voice instruction.

### III. MODELING AND ANALYSIS

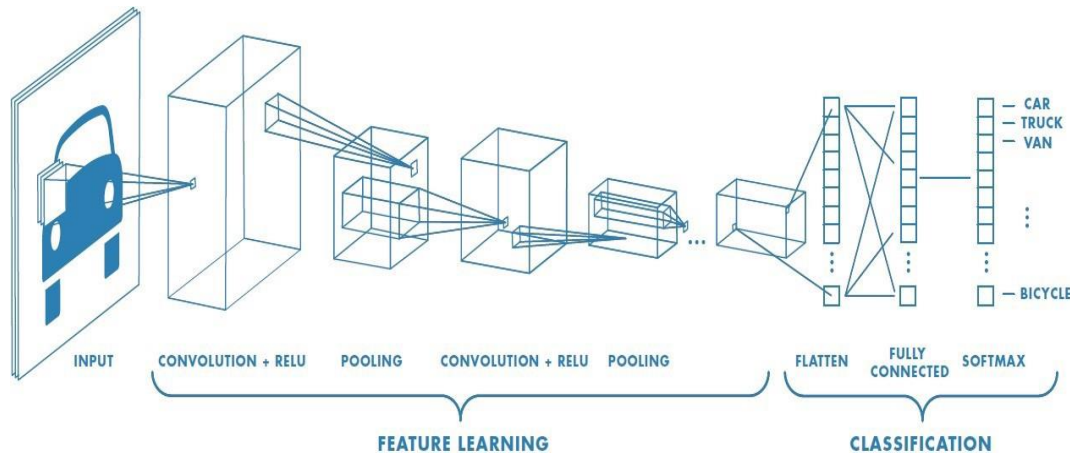


Figure 1: Working of Convolutional Neural Network

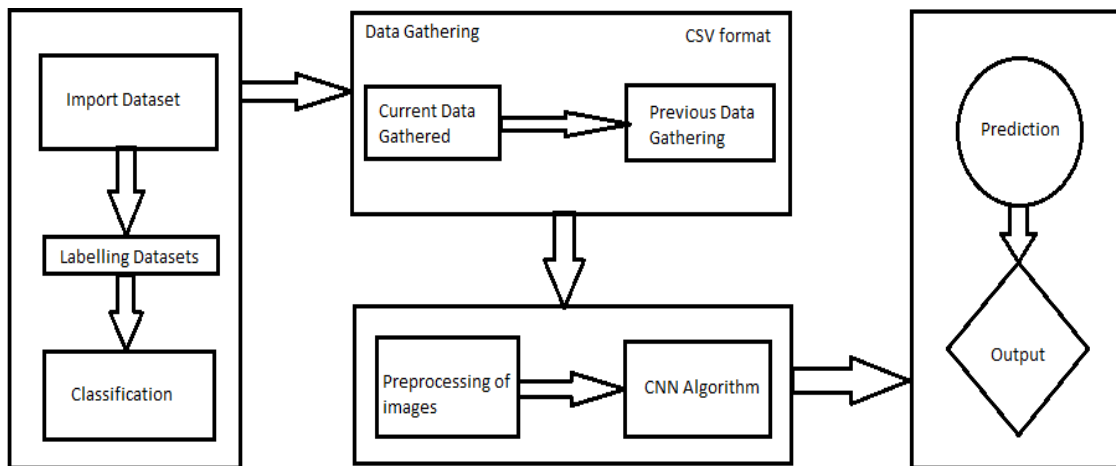


Figure 2: System Architecture

### IV. RESULTS AND DISCUSSION

Our proposed system identifies traffic signs and gives the result in the form of a voice instruction to a user successfully. Image augmentation increases the efficiency and makes the image clearer. Image processing improves the speed of image detection. Advancement in the project can be done so that it can be used for giving penalty warnings for breaking traffic regulations such as for breaking the signal, over speeding, etc.

### V. CONCLUSION

All In the algorithm we have used i.e. CNN (Convolutional Neural Network). This algorithm is one of the best deep learning algorithms which can be used for automating the processing of images. With deep learning methods it is very easy to perform various machine learning tasks. Such tasks are usually classification of different classes of objects. CNN is one of the best algorithms which can also be used for analysis of images. This algorithm also has a unique ability to learn from data that has been collected and can also help to interpret the data and gather results. There are many inferences obtained from analyzing the images of the same types of data. The normal procedure begins when the image of the real time image of traffic sign is captured by the high resolution camera present in the car. This image is then analyzed and processed by CNN with the help of image augmentation and is then compared with the images that are present in the datasets. After comparing the image with the datasets, CNN helps to interpret which dataset the image belongs to and reports the result of the image in the form of a voice instruction to the user. So, the proposed system will make a huge impact on the traffic rules and regulations followed by the driver when the user follows the voice instructions given by the module thus decreasing the rate of accidents. This will ensure safe driving and following traffic regulations. Further we can improve the performance and accuracy of our system by using high resolution cameras, more refined datasets.

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