VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

PROJECT WORK-4 REPORT

on

"Traffic Sign Recognition"

Submitted by

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Under the guidance of

Dr.Selva Kumar S

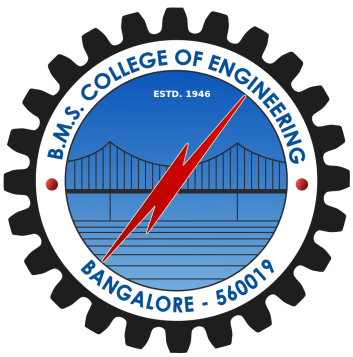
Assistant Professor,BMSCE

in partial fulfilment of the requirements for the degree of

Bachelor of Engineering

in

COMPUTER SCIENCE AND ENGINEERING



B. M. S. COLLEGE OF ENGINEERING

(An autonomous institution affiliated to VTU, Belagavi)

Bull Temple Road, Basavanagudi, Bengaluru - 560 019

April-2022 to July-2022

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Bull Temple Road, Basavanagudi, Bengaluru - 560 019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer science and Engineering

Certificate

This is to certify that the project work entitled **"Traffic Sign Recognition"** carried out by **Krishna Mohan Dulloli(1BM19CS075),Nikhil S N(1BM19CS102),** AND **Niranjan Nagraj Savnur(1BM19CS104)** who are bonafide students of B. M. S. College of Engineering. It is in partial fulfillment for the award of Bachelor of Engineering in Computer Science and Engineering of the Visveswaraiah Technological University, Belgaum during the year 2021. The project report has been approved as it satisfies the academic requirements in respect of Project Work-4 (20CS6PWPW4) work prescribed for the said degree.

Signature of the incharge	Signature of the HOD
Prof. Selva Kumar S	Dr. Jyothi S Nayak
Assistant Professor	Professor Head, Dept. of CSE
BMSCE, Bengaluru	BMSCE, Bengaluru

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Name of the Examiner	Signature with Date
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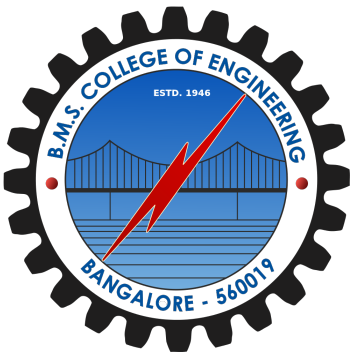
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



DECALARATION

We, Krishna Mohan Dulloli(1BM19CS075),Nikhil S N(1BM19CS102),Niranjan Nagraj Savnur(1BM19CS104) students of 6th Semester, B.E, Department of Computer Science and Engineering, B. M. S. College of Engineering, Bangalore, hereby declare that, this Project Work4 entitled "Traffic Sign Recognition" has been carried out by us under the guidance of Dr.Selva Kumar, Professor, Department of CSE, B. M. S. College of Engineering, Bangalore during the academic semester Apr-2022-Aug-2022

Krishna Mohan Dulloli (1BM19CS075)

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Niranjan Nagraj Savnur (1BM19CS104)

Place: Date:

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Chapter 1
Introduction

Traffic signs are integral part of our road infrastructure as they provide useful information and compel us to take actions based on that. without which drivers might get into more accidents as they don't know how fast they should drive or where construction work is going on etc. In current traffic management systems, there is a high probability that the driver may miss some of the traffic signs on the road because of overcrowding due to neighbouring vehicles. With the continuous growth of vehicle numbers in urban agglomerations around the world, this problem is only expected to grow worse.

A visual-based traffic sign recognition system can be implemented on the automobile with an aim of detecting and recognizing all emerging traffic signs. The same would be displayed to the driver with alarm-triggering features if the driver refuses to follow the traffic signs.

1.1 Motivation

Highway maintenance. Nowadays, a human operator has to watch a videotape to check the presence and condition of the signs. It is a tedious task because the signs appear from time to time, and because the operator has to pay great attention. Sign inventory. It is basically the same application but in towns and cities. In this case the environment is more difficult than highways. The signs are not always placed perpendicular to the movement of the vehicles, producing a deformed image of the signs; besides, there are occlusions, and other objects with the same colour. There has been little work in this

1.2 Scope of the Project

Traffic sign detection and recognition plays an important role in expert systems, such as traffic assistance driving systems and automatic driving systems. It instantly assists drivers or automatic driving systems in detecting and recognizing traffic signs effectively.

1.3 Problem Statement

To analyze a given image of a traffic sign and predict what class it belongs to. Employ different image recognition deep learning architecture for our test case/scenario and train traffic signs categorized into 40 different classes and compare the accuracy of these models.

Chapter 2
Literature Survey

Resnet solves the problem of vanishing gradients,the way it does is by introducing a skip connection in which the parameters are skipped from passing through a layer or several layers. EfficientNet is a convolutional neural network architecture and scaling method that uniformly scales all dimensions of depth/width/resolution using a compound coefficient. Unlike conventional practice that arbitrary scales these factors, the EfficientNet scaling method uniformly scales network width, depth, and resolution with a set of fixed scaling coefficients. Inception net has outputting layer in between hidden layers(marked with box in above image) These output classifier will have softmax function like the final one, it trys to predict to see the accuracy level it is reaching till a particular layer.

Paper	Authors	Accuracy on imagenet
Alexnet	Alex Krizhevsky Ilya Sutskever and Geoffrey Hinton	84.7%
Resnet	He et al.	82.94%
InceptionNet	Pierre Sermanet, Scott Reed, Dragomir Anguelov.	92.3%
vgg-16	Karen Simonyan & Andrew Zisserman	92.7%
EfficientNet	Mingxing Tan and Quoc V. Le	97%

Figure 2.1: Literature survey

Chapter 3

Design

3.1 High Level Design

The system diagram below, shows the system design of an application which illustrates how the raw data is provided to the system and then predicted class is retrieved

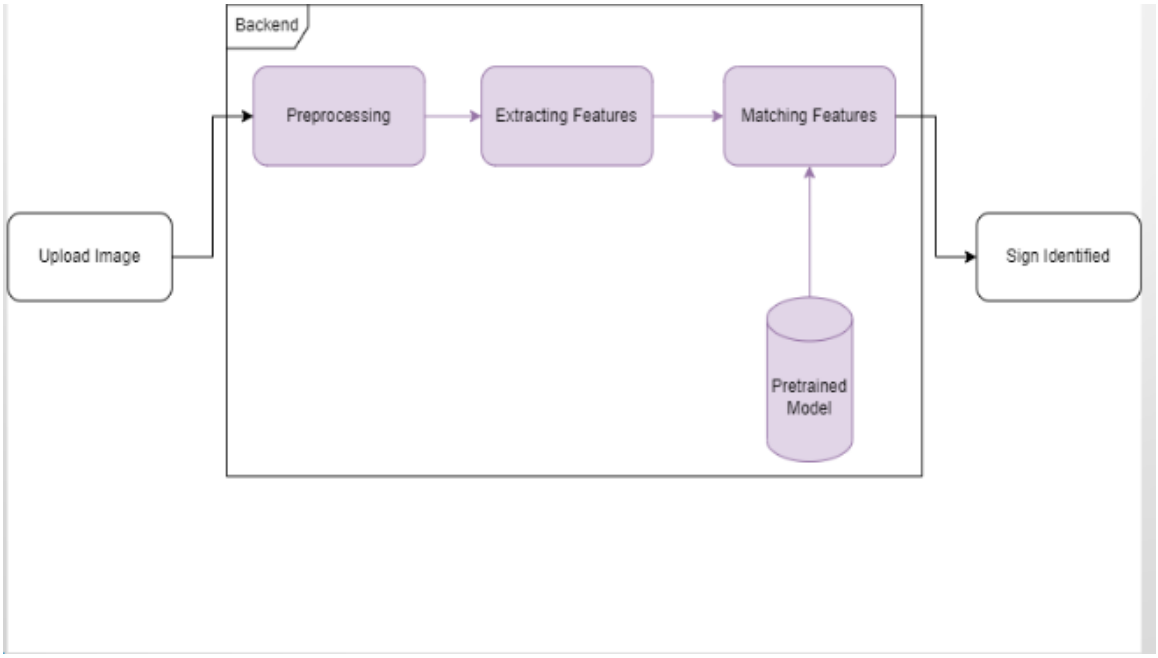

Figure 3.1: Highlevel Design

3.2 Detailed Design

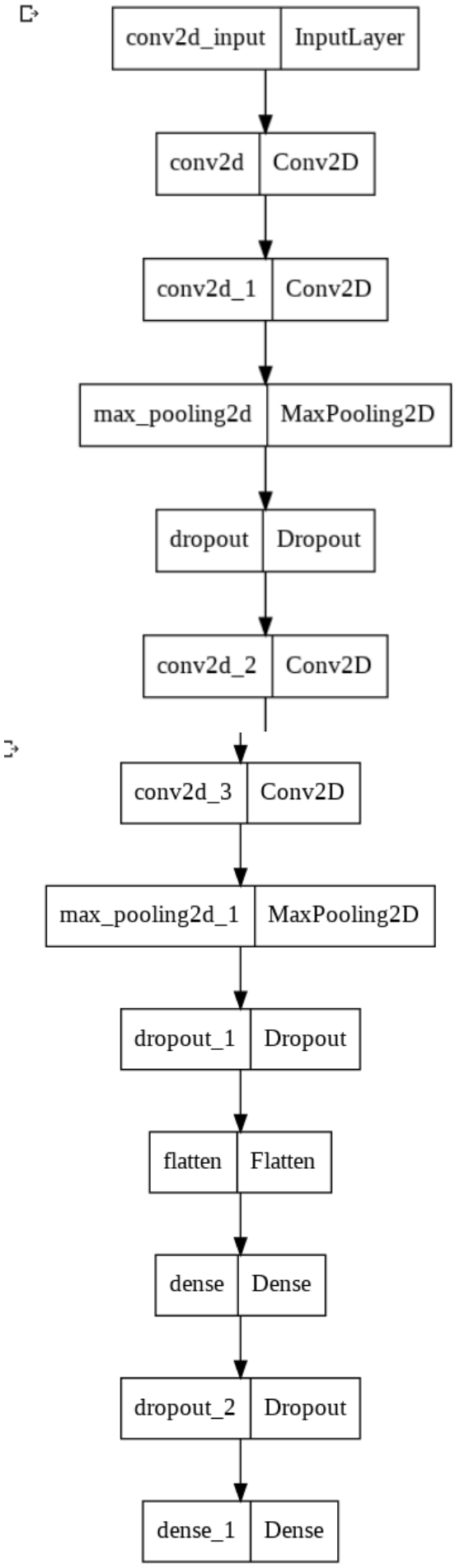

Figure 3.2: Detailed Design

3.3 Sequence Design

Sequence diagram demonstrates the sequence of action performed during the run time of an application. The below diagram shows, how each process is executed

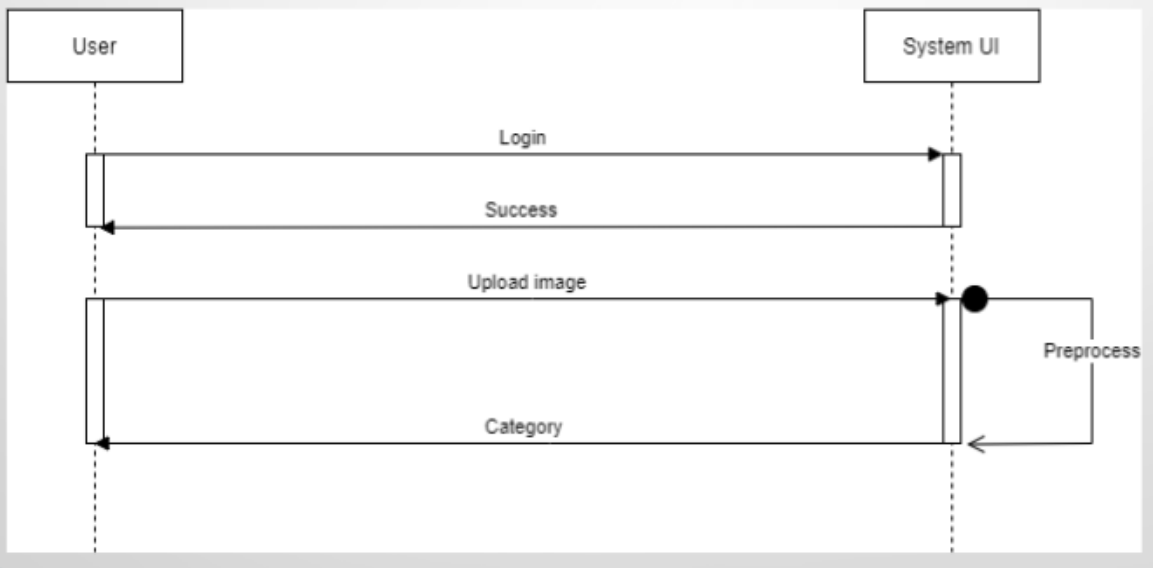

Figure 3.3: Sequence Diagram

3.4 Usecase Design

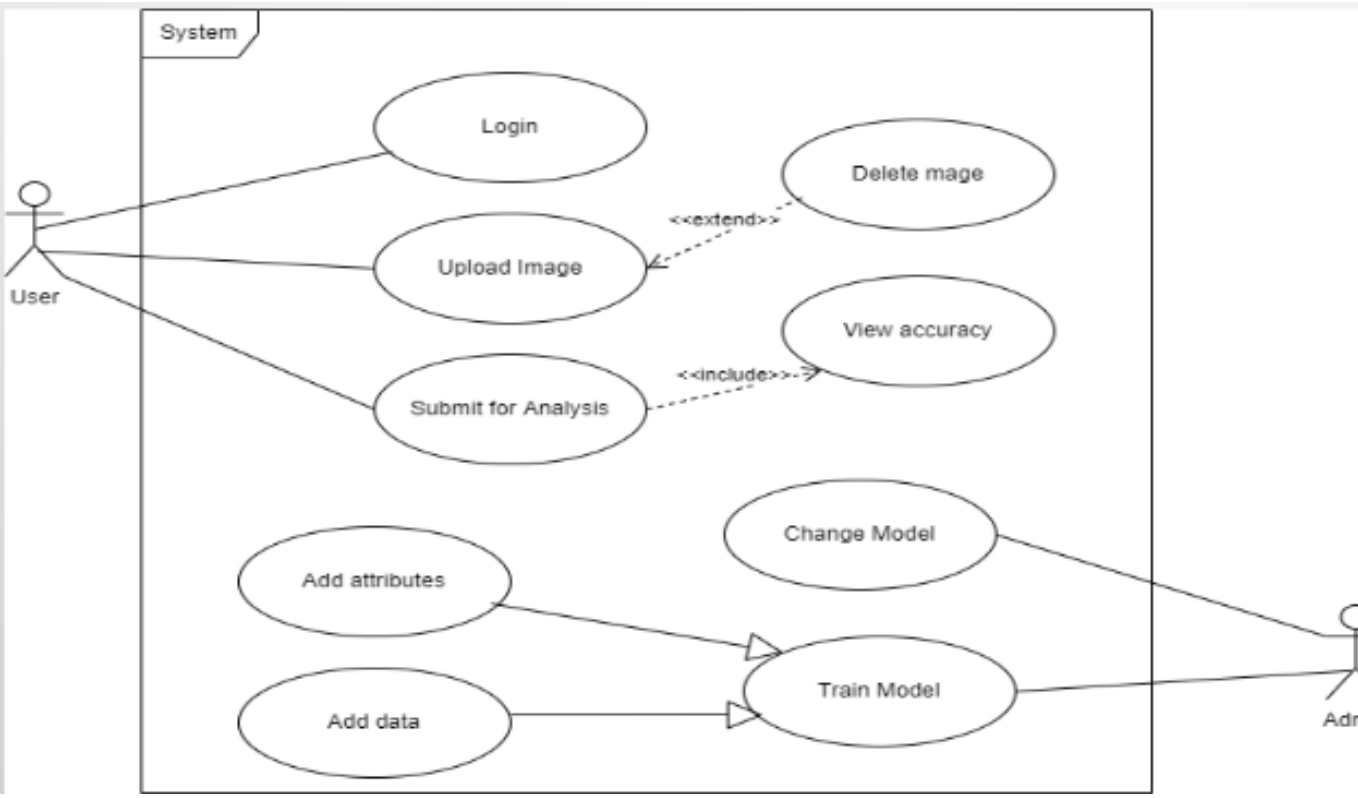

Figure 3.4: Usecase Diagram

Usecase:1 The data is perfectly fed into the system and the output classs is predicted with the expected accuracy. output is the displayed then displayed on the dashboard

Chapter 4
Implementation

4.1 Proposed methodology

Divide initial dataset into Test and Train datasets(Completely Different) with 80Train these models using Transfer Learning and check the accuracy of each. Develop own model which classifies images in our dataset with best possible accuracy on the given dataset.

4.2 Algorithm used for implementation

Vgg-19 fine tuned

Vgg-16 is a big model with about 138 million parameters but it has a simple and orderly architecture. It follows the order of having two convolutional layers followed by a pooling layer. It repeats the above order and doubles the number of filters after each sequence.

It was trained on ImageNet. When tested it gives an average error rate of about 13

efficient net fine tuned

EfficientNet is a convolutional neural network architecture and scaling method that uniformly scales all dimensions of depth/width/resolution using a compound coefficient.Input image size need not be fixed like many other models which specify fixed input

Convolution network

Finally we implement our own model as all the images in dataset are of lower pixel values the models that we are fine tune usually need the fixed image size which is of roughly 224X224X3, scaling up our image size might result in loss of useful data.

4.3 Tools and technologies used

Frontend app framework: Flask

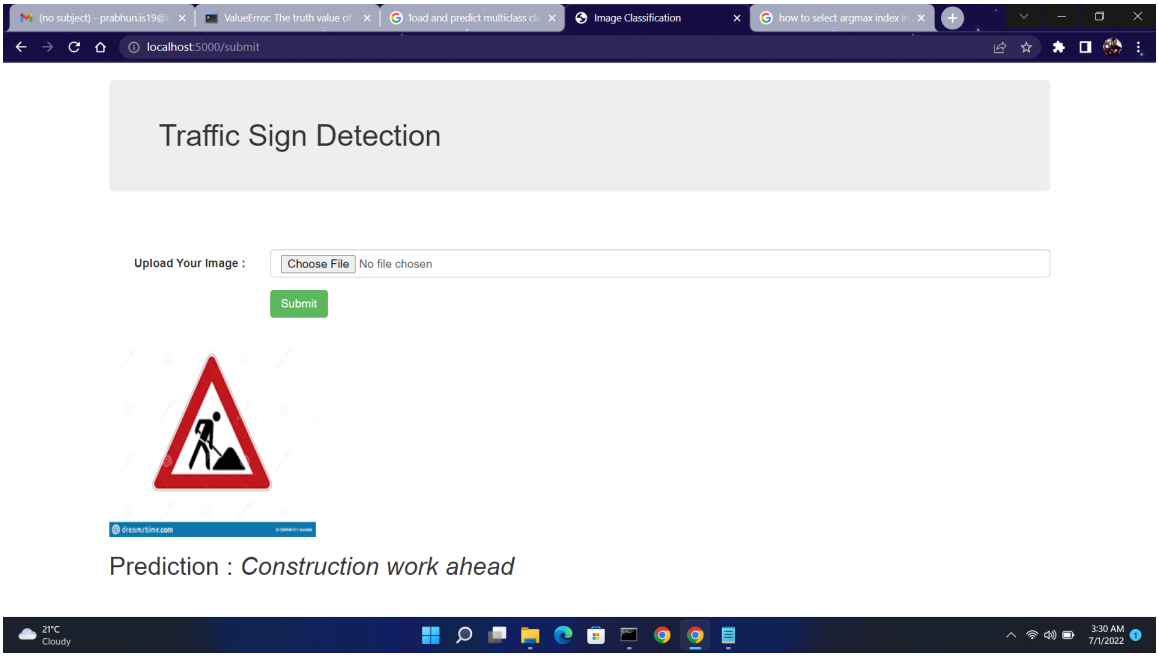

Figure 4.1: Streamlit

Ide: jupyter notebook ,sublime text

Language: python

Libraries: Tensorflow, NumPy, matplotlib

4.4 Testing

All models were tested on same testing set containing about 20 images in each class of testing set. Libraries like tensorflow,pillow, numpy were used to preprocess and test the data. Images in testing dataset were completely different from Training data which make sures that our model canclassify on new images.

Chapter 5
Results and Discussion

As we can see from below figure the model that we built works better than the others,This because we built model for lower dimensional images, where as when we fine tune it we will be scaling up the dimensions in our image resulting in fauty addition of data to our image

Model	Accuracy
Vgg-19	56%
Resnet-150	79%
Efficient-Net	95.9%
Newly built model	94.8%

Figure 5.1: Result

Chapter 6
Conclusion and Future Work

Traffic sign detection and recognition plays an important role in expert systems, such as traffic assistance driving systems and automatic driving systems. It instantly assists drivers or automatic driving systems in detecting and recognizing traffic signs effectively. In future we can do object detection and classify the extracted detected object in our model using ensemble learning this will result in a better prediction.

6.1 References

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