INSTITUTE OF ENGINEERING AND TECHNOLOGY LUCKNOW

Traffic Sign Recognition using CNN

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INTRODUCTION

- Traffic sign detection and classification plays an important role in our daily life.
- Traffic signs are designed in such a way that they have different colours, shape icons, text, and also follow a wide range of variations between classes.
- Despite this, drivers make mistakes and misinterprets traffic signs. This leads to accidents, causes deaths, and damage to the vehicle.
- To overcome this problem this project introduces the concept of **“Traffic Sign Recognition”**.

OBJECTIVE

- **Problem**
  - Traffic Sign Detection and Classification using CNN

- **Challenges :**
  - Data Selection, Model Training, and Validation
  - Wide variability in visual appearance
  - Illuminations, Weather conditions

- **Goal :**
  - High accuracy in classifying the Traffic sign in the “real world”
  - To ensure safety of Driver and Vehicle.

TOOLS AND TECHNOLOGY

- **Language**
  - Python (3.10.0)
- **Libraries**
  - Numpy
  - Tensorflow
  - Keras
  - SkLearn
  - Matplotlib
  - OpenCV
- **Platform**
  - Jupyter Notebook

MOTIVATION

- Traffic Signs ensures the safety and prevent accidents when people drive.
- Understanding Traffic signs and following traffic rules, as well as contribution to the development of autonomous driving systems.

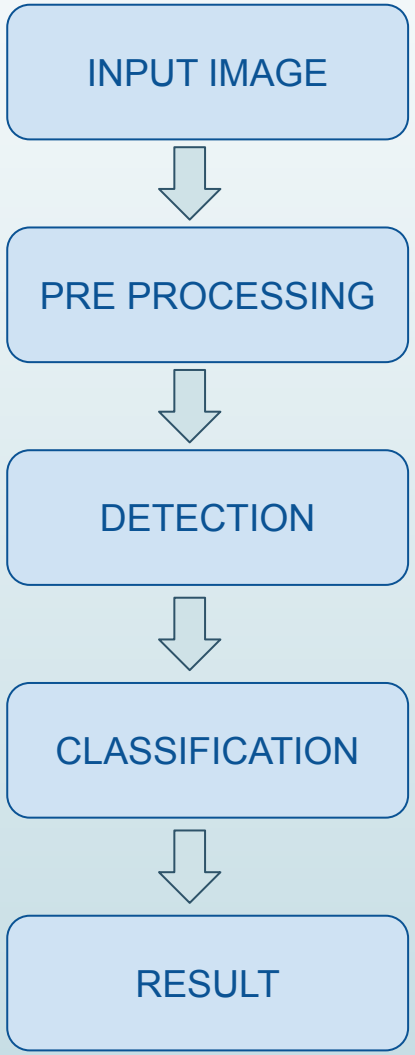
RELATED WORK

- **Yanzhao Zhu, Wei Qi Yan** proposed a Traffic Sign Recognition method on account of Deep Learning that is used to create a Traffic Sign Recognition Algorithm that focus on Circular Traffic Signs. The accuracy of this procedure was 98.2%.

- **Zhilong He, Zhongjun Xiao, Zhiguo Yan** came up with a system that can detect and classify a set of 28 Traffic Sign Categories, which include Warning Signs, Traffic Calming Signs, etc. The result are moderate and it can be improved by testing different Neural Network Structures.

- **Wenhui Li, Daihui Li and Shangyou Zeng** proposed a system for Traffic detection and Recognition and a method for extracting a road sign from a natural complex image, processing it and giving warning to the driver through voice commands.

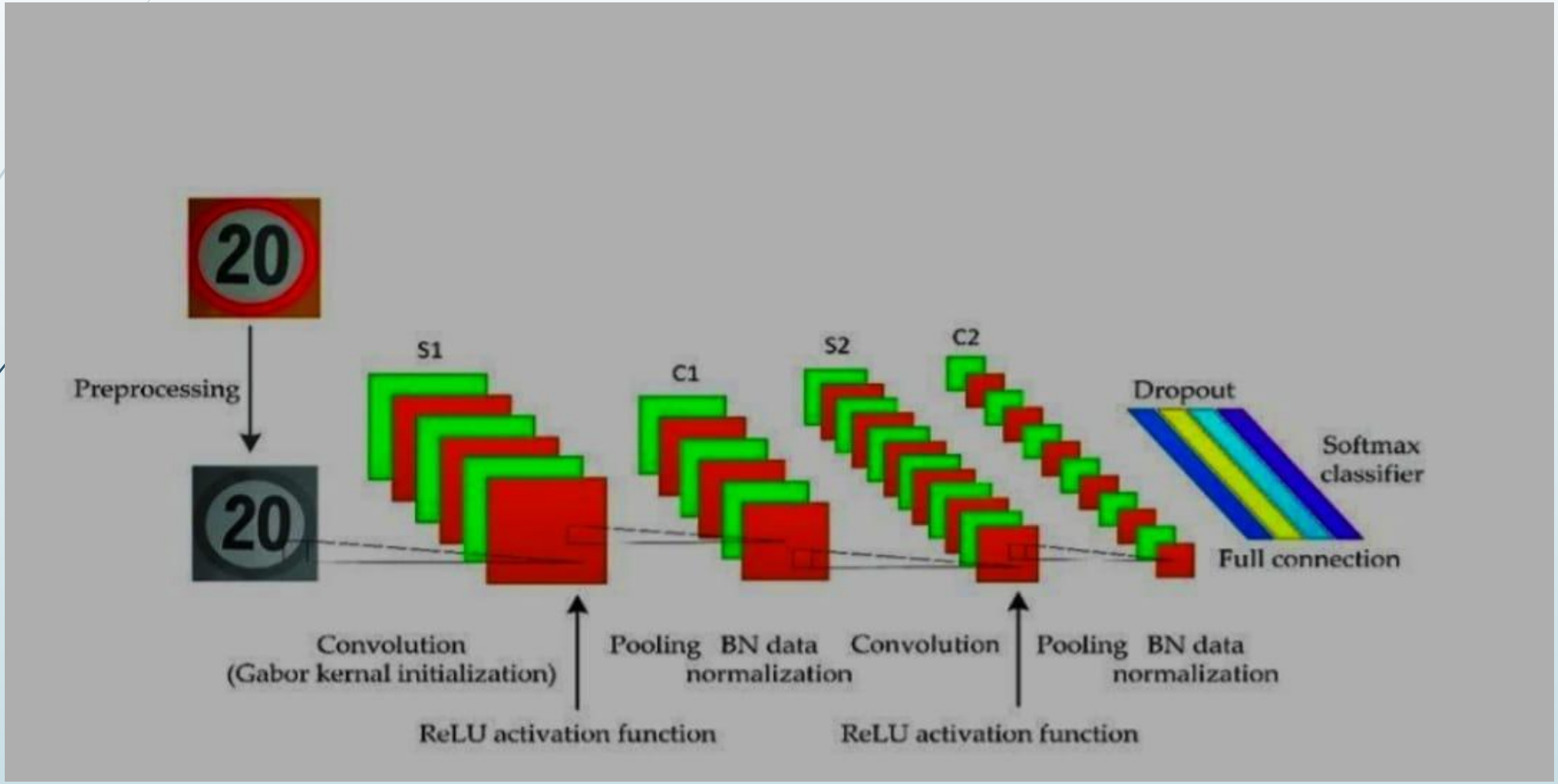
METHODOLOGY



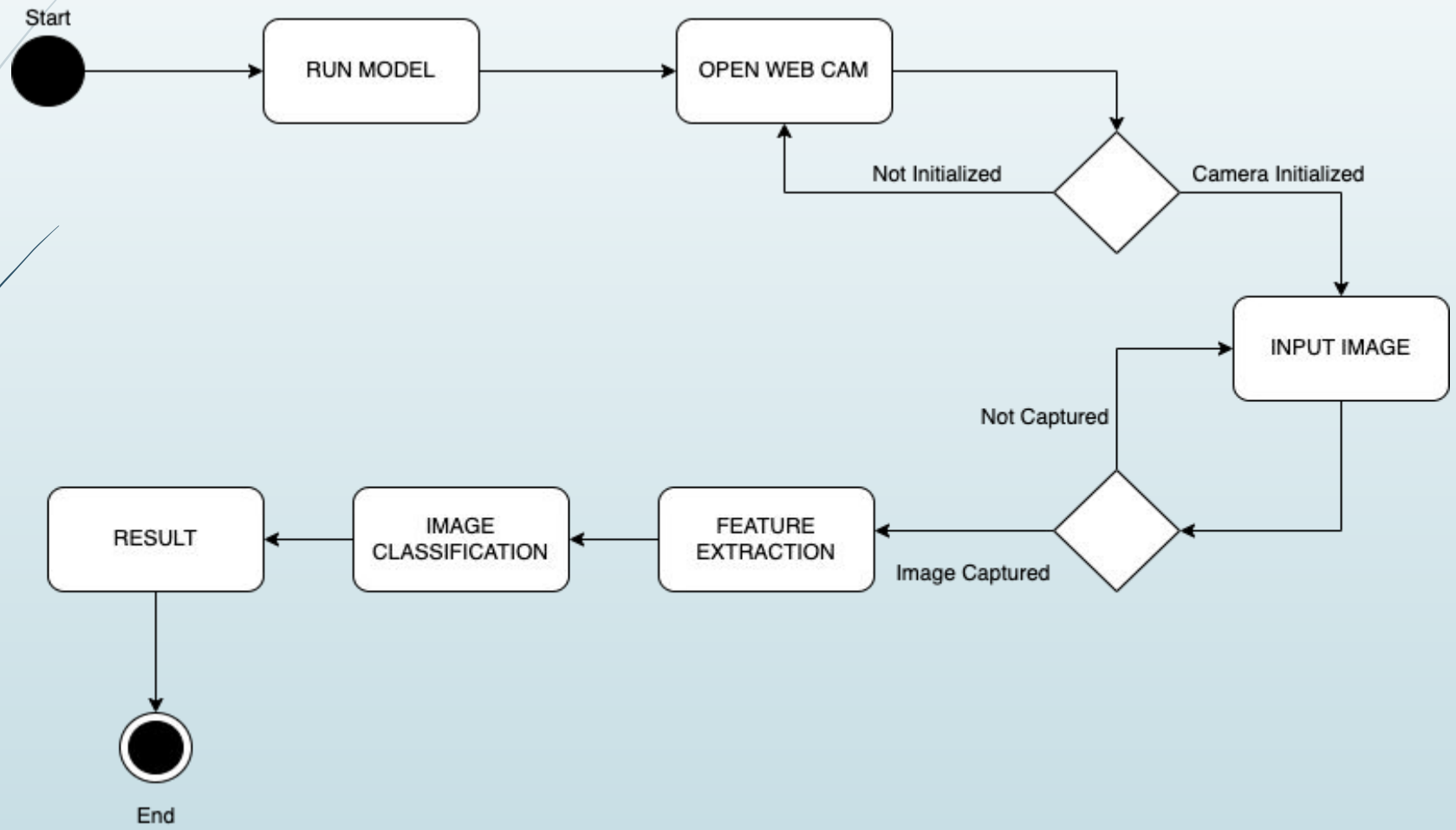
PROPOSED MODEL

- We are implementing the solution of Traffic Sign Recognition problem with the help of **Image Classification** using **CNN**
- CNN : A Neural Network of Deep Learning designed for handling the processing of structured arrays of data such as Images
- Used **Data Augmentation** to generate the additional data for the Model Training process.

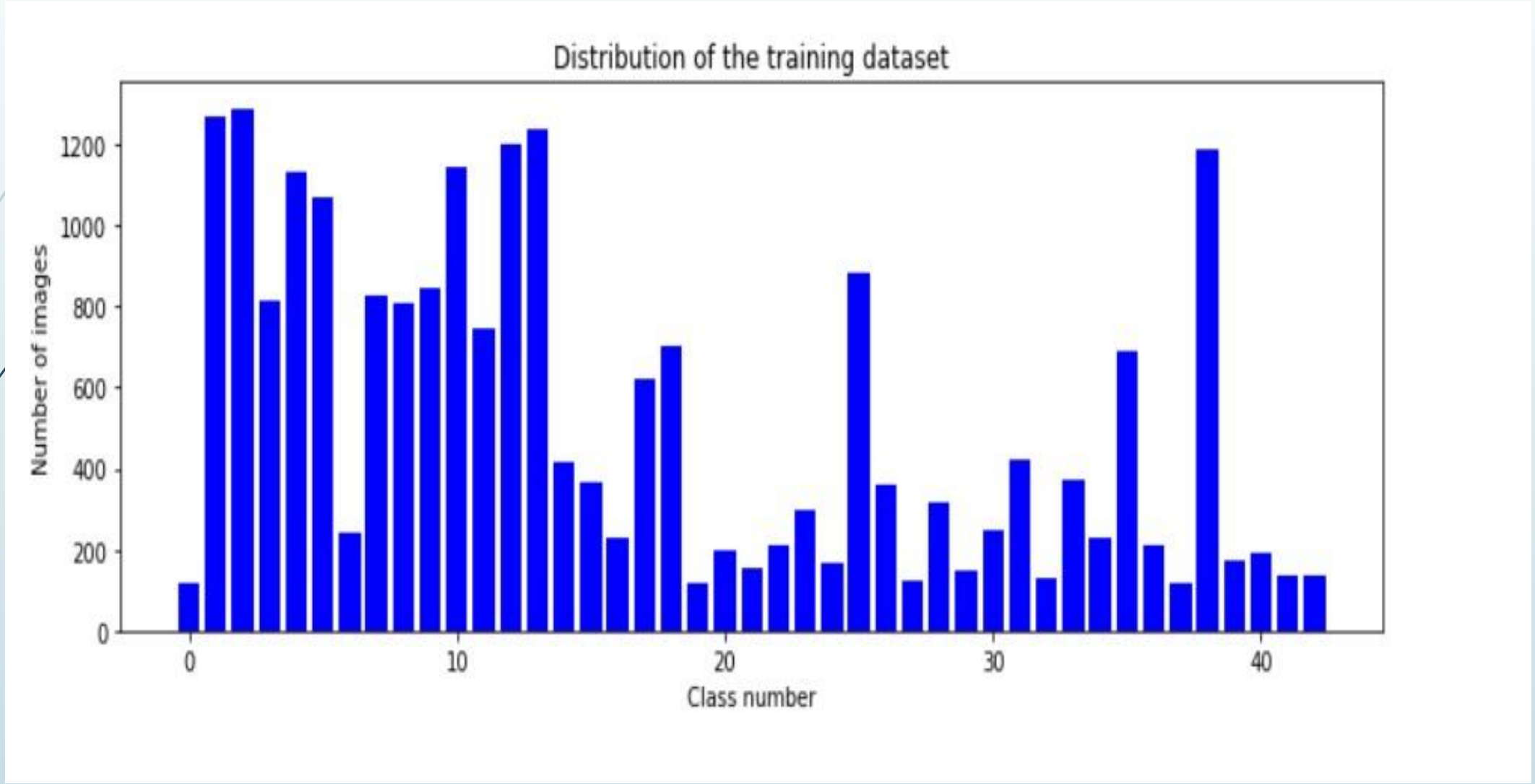
Working of CNN Model



Activity Diagram

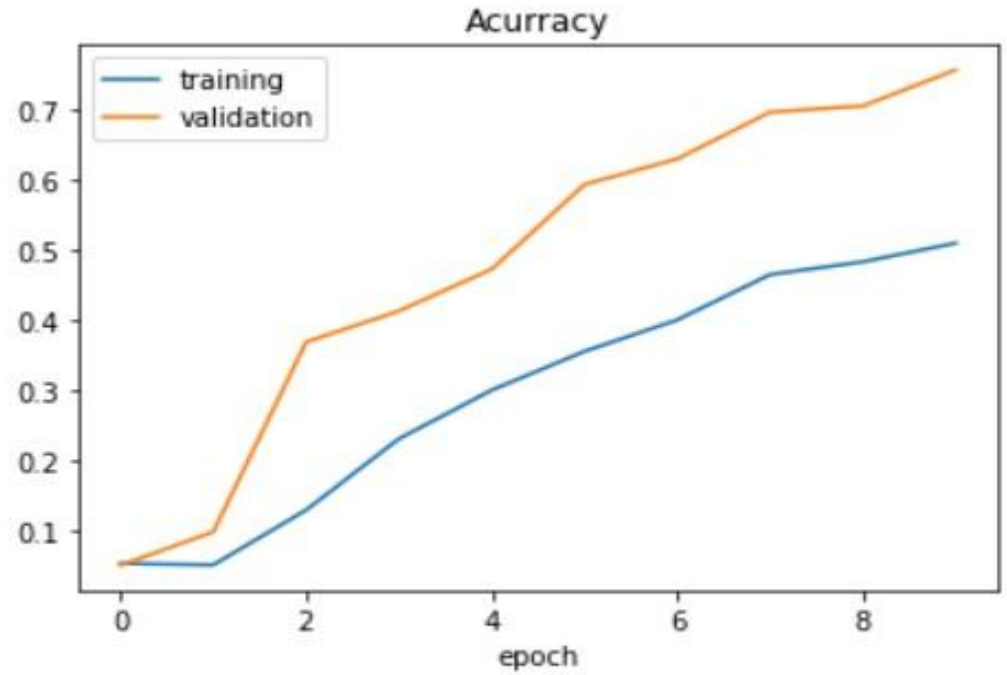


DATA DISTRIBUTION



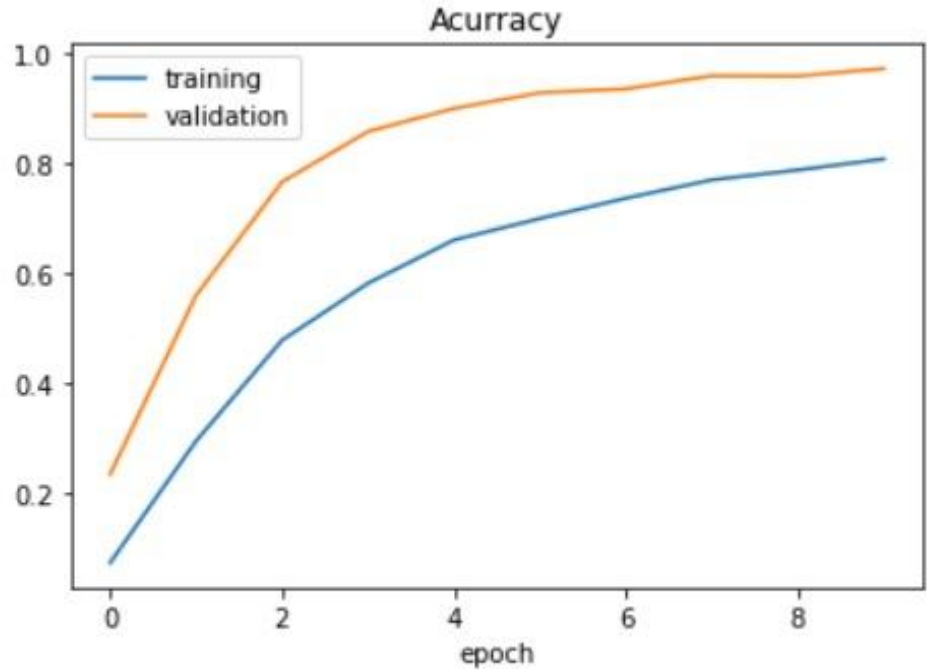
RESULT AND DISCUSSION

Previous Accuracy Graph of the Model



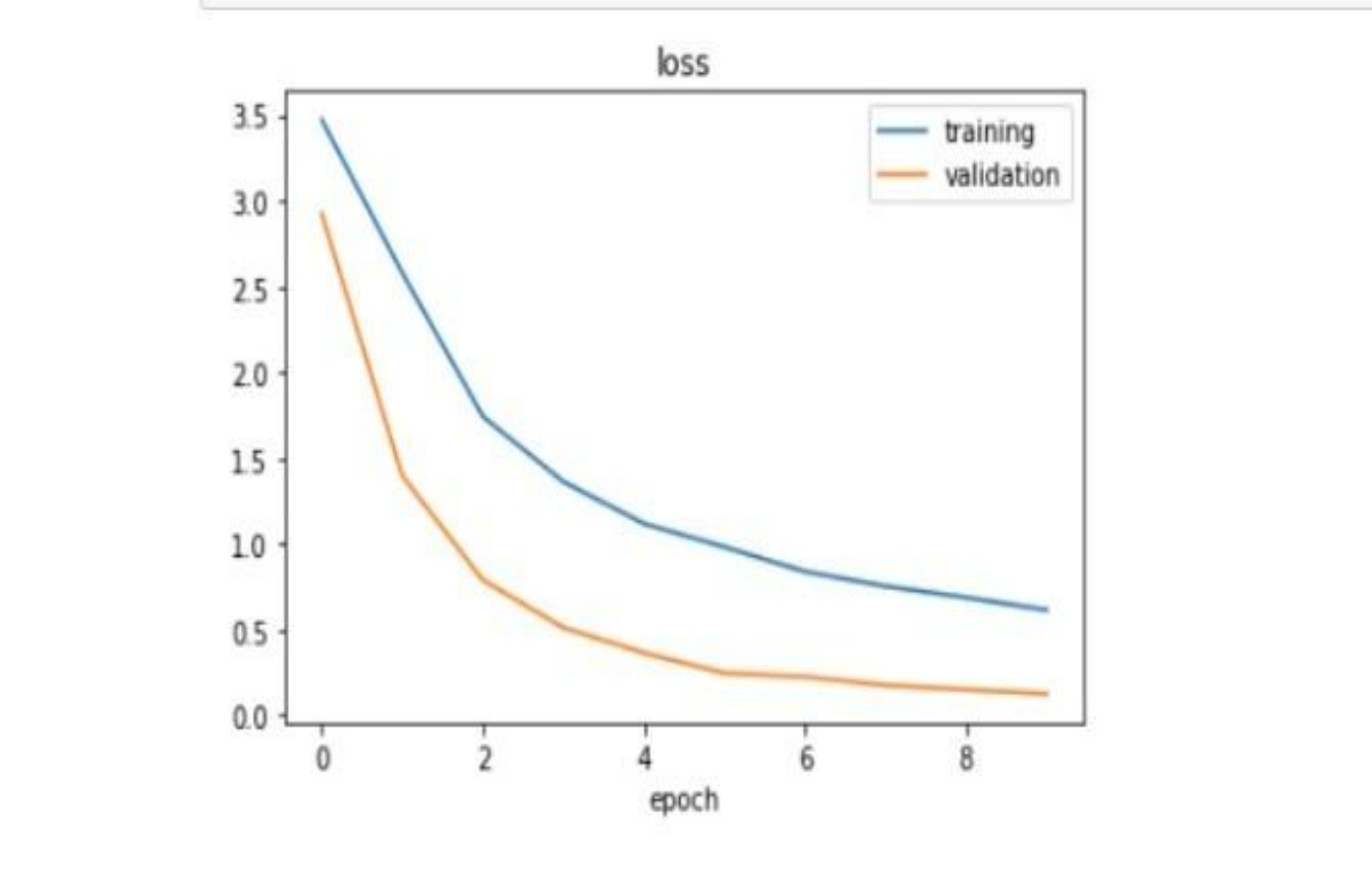

```
Test Score: 0.8652727603912354
Test Accuracy: 0.7683908343315125
```

Current Accuracy Graph of the Model

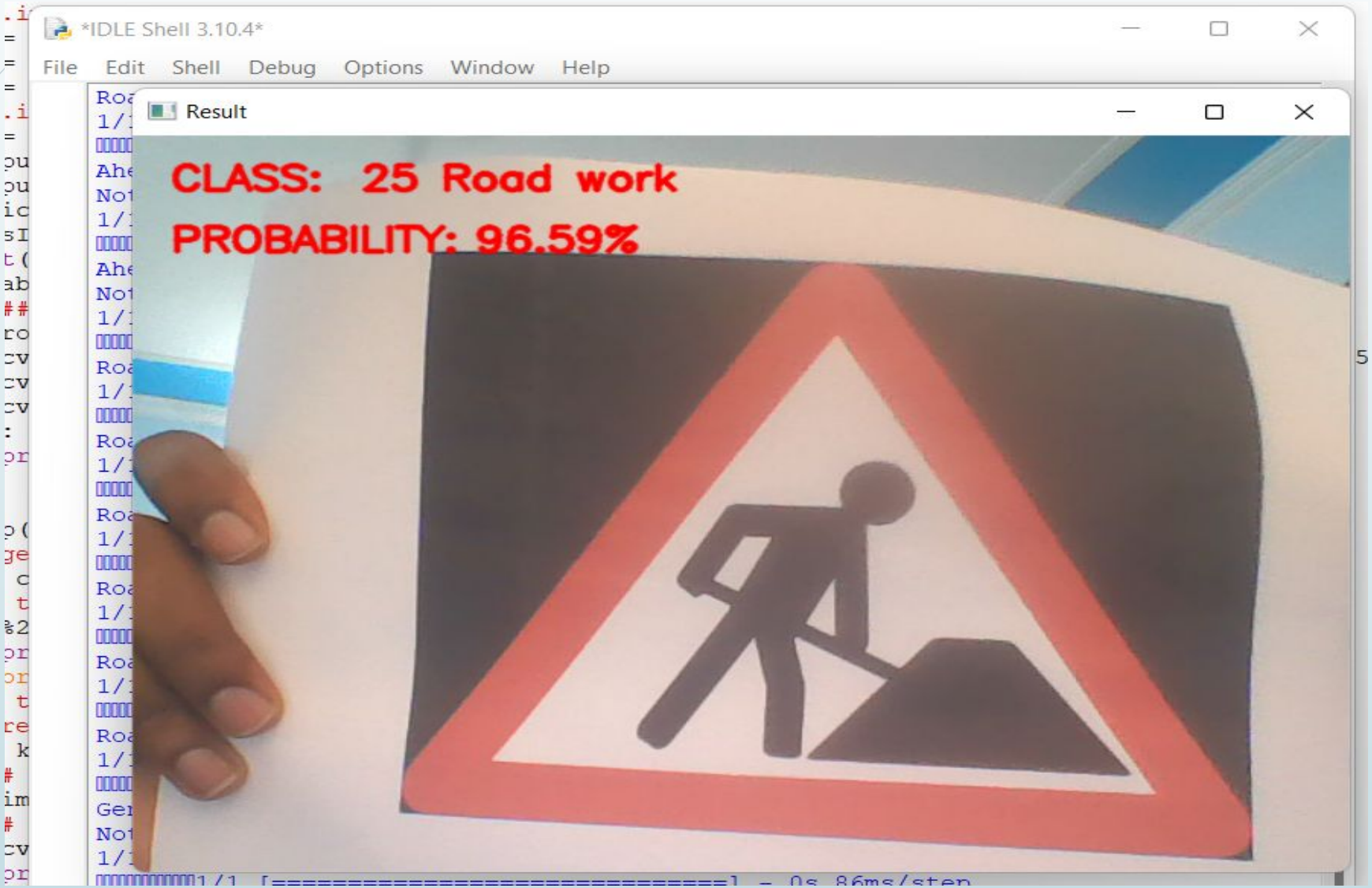



```
Test Score: 0.1363191455602646
Test Accuracy: 0.9673850536346436
```

Loss Graph of the Model



Output


IDLE Shell 3.10.4
File Edit Shell Debug Options Window Help
Result
CLASS: 25 Road work
PROBABILITY: 96.59%

FUTURE SCOPE

- Self Driving Cars
- Traffic Assistance Driving System
- Useful for Blind Persons

REFERENCES

- Zhilong He, Zhongjun Xiao, Zhiguo Yan, “Traffic Sign Recognition based on Convolutional Neural Network”, Chinese Automation Congress, IEEE 2020.

- Wenhui Li, Daihui Li and Shangyou Zeng, “Traffic sign Recognition with a small Convolutional Neural Network”, IOP Publishing Ltd, 2019.

- Yanzhao Zhu, Wei Qi Yan, “Traffic Sign Recognition based on Deep Learning”, Auckland University of Technology, CBD, 2022.

- Prashengit Dhar, Md. Zainal Abedin, Tonoy Biswas and Anish Dutta, “Traffic Sign Detection - A new approach and Recognition using CNN”, IEEE Region 10 Humanitarian Technology Conference (R10-HTC), 2017

- Dataset : https://www.kaggle.com/datasets/meowmeowmeowmeowmeow/gtsrb-german-traffic-sign

CONCLUSION

- The Proposed Model is an effective method for performing the Traffic sign Classification and Detection.

- The condition of Traffic Sign whether blurry, small in size, improperly displayed, this mechanism helps in recognising Traffic signs and alert us.

Thank You