IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204222 |

Traffic Sign Recognition using YOLO

Navas A, Roshin R, Sisira C, Maneesha M, Shabana M R

Department of Computer Science, Nethaji College of Arts & Science, Nenmara, Kerala, India

ABSTRACT: Detection and recognition of a large number of traffic-sign categories remains an open question. Various previous benchmarks have addressed the trafficsign recognition and detection task. However, several of them focused only on traffic-sign recognition (TSR) and ignored the much more complex problem of traffic-sign detection (TSD) where finding accurate location of traffic sign is needed. Other benchmarks that do address TSD mostly cover only a subset of traffic-sign categories, most often ones important for ADAS and autonomous vehicles applications. Most categories appearing in such benchmarks have a distinct appearance with low inter-category variance and can be detected using handcrafted detectors and classifiers. Such examples include round mandatory signs or triangular prohibitory signs.

KEYWORDS: CNN,TSR,Signs, Traffic,YOLO

I. INTRODUCTION

Automatic detection and recognition of traffic signs plays a crucial role in management of the traffic-sign inventory. It provides an accurate and timely way to manage traffic-sign inventory with a minimal human effort. In the computer vision community, the recognition and detection of traffic signs are a well-researched problem. A vast majority of existing approaches perform well on traffic signs needed for advanced driver-assistance and autonomous systems. However, this represents a relatively small number of all traffic signs (around 50 categories out of several hundred) and performance on the remaining set of traffic signs, which are required to eliminate the manual labor in traffic-sign inventory management, remains an open question. In this paper, we address the issue of detecting and recognizing a large number of traffic-sign categories suitable for automating traffic-sign inventory management. We adopt a convolutional neural network (CNN) approach, the mask R-CNN, to address the full pipeline of detection and recognition with automatic endto-end learning. We propose several improvements that are evaluated on the detection of traffic signs and result in an improved overall performance. This approach is applied to detection of 20 traffic-sign categories represented in our novel dataset. The results are reported on highly challenging traffic-sign categories that have not yet been considered in previous works. We provide comprehensive analysis of the deep learning method for the detection of traffic signs with a large intra-category appearance variation and show below 3% error rates with the proposed approach, which is sufficient for deployment in practical applications of the traffic-sign inventory management.

Fig : Traffic signs

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204222 |

II. MODULE DESCRIPTION

The proposed system has three modules.

1. User module
2. Admin Module

1.User module:
The user can do the following in this website.

- The user can register by using his basic details
- The user can login with his user name and password.
- The user can manage his profile.
- The user can open camera.
- The user can detect traffic sign.

2. Admin module

The admin is the super controller of the system The administrator is also called the super user. . The admin can manage every model in the system. The admin can do the following

- The admin can list/edit/remove users
- The admin can list/edit/remove signs
- The admin can view feedbacks
- The admin can manage his profile

III. EXISTING SYSTEM

Before the development of the proposed system, the existing system for traffic sign recognition may involve manual methods or traditional computer vision techniques that are less efficient and accurate compared to deep learning-based approaches. Here is an outline of the existing system:

1. Manual Detection and Recognition:
In the absence of an automated system, drivers rely on their own observation and knowledge to detect and recognize traffic signs. This can be error-prone, especially in cases of obscured or distant signs, poor visibility conditions, or driver distraction.

2. Traditional Computer Vision Techniques:

Some existing systems might employ traditional computer vision techniques such as edge detection, color segmentation, and template matching to identify traffic signs in images. However, these methods can struggle with variations in lighting, backgrounds, and sign shapes, leading to suboptimal accuracy.

3. Limited Automation:

Existing systems might use basic automation to assist drivers, such as providing auditory or visual alerts based on simple rule-based approaches. For example, if a camera detects a red circular shape, it might trigger an alert about a possible stop sign.

4. Manual Sign Databases:

Some navigation systems might use manually curated databases of traffic sign images and their corresponding meanings to provide basic assistance. However, these databases are limited in size and may not cover all possible scenarios.

5. Challenges with Varied Situations:

Traditional systems might struggle to adapt to diverse scenarios, such as different types of traffic signs, varying weather conditions, and changing road environments.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204222 |

6. Lack of Real-Time Performance:

Real-time performance might be limited due to the computational demands of traditional computer vision methods, making it difficult to provide instantaneous feedback to drivers.

7. Limited Scalability:

These existing systems might not easily scale to handle the increasing complexity of modern driving environments, including the rapid expansion of autonomous vehicle technologies.

8. Dependency on Human Interpretation:

Existing systems might require drivers to interpret the system's alerts or suggestions, potentially leading to misunderstandings or delays in response.

Overall, the existing system for traffic sign recognition lacks the accuracy, efficiency, and adaptability that deep learning-based approaches can offer. The proposed YOLOV3-based system aims to overcome these limitations by leveraging the power of deep neural networks to automatically detect and recognize traffic signs with higher accuracy, real-time performance, and adaptability to various driving scenarios

.

IV. PROPOSED SYSTEM

Traffic sign recognition and detection is an important part of any autonomous vehicle. However, the real challenge lies in the detection and recognition of these traffic sign from the natural image in real time and with accuracy. This paper gives an overview of the traffic road sign detection and recognition system, we developed and implemented using an artificial neural network which is trained using real-life datasets. This paper presents the usage of convolution neural network along with dataset as an implementation of our project to attain real-time result with accuracy. The system developed based on this methodology can be implemented in public transports, personal cars, and other vehicles in order to keep drivers alert and reduce human errors that lead to accidents. The project has a wide implementation of self driving vehicles.

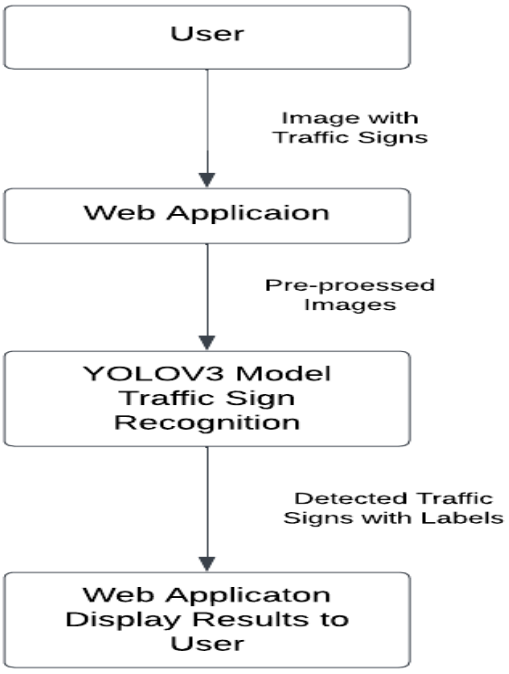

Fig: Traffic Sign Recognition Process

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204222 |

The framework we proposed is categorized into three stages: Detection and feature extraction and recognition. The detection stage is just used to find a road sign. At the point when a vehicle is traveling at a specific speed, the camera catches the road sign in nature, and our calculation verifies whether a sign is available in that outline or not available in that perimeter. Distinguishing the traffic sign depends on shape and color. In the feature extraction stage, the proposed calculation characterizes the distinguished road sign. This is accomplished with the assistance of "Convolutional Neural Network" algorithm which classifies the image into sub classes.

V. CONCLUSION

Automatic detection and recognition of traffic signs plays a crucial role in management of the traffic-sign inventory. The issue of detecting and recognizing a large number of traffic-sign categories suitable for automating traffic-sign inventory management. We adopt a convolutional neural network (CNN) approach, the mask R-CNN, to address the full pipeline of detection and recognition with automatic endto-end learning. We propose several improvements that are evaluated on the detection of traffic signs and result in an improved overall performance. In this project, we have discussed that how our proposed system detects the traffic signal and recognizes using machine learning algorithms. The proposed system is also scalable for detecting and recognizing the traffic sign by image processing. The system is not having complex process to detect and recognize that the data like the existing system. Proposed system gives genuine and fast result than existing system. Here in this system we use cnn algorithm to detect and recognize the traffic sign.

VI. FUTURE ENHANCEMENT

Recently, there is redundant research work emerging for recognizing traffic signs for handling with the real-world problems. On the one hand, in future, we will complete our benchmark by covering more types of the traffic signs in NZ so that we can make this project more instructional in this field. On the other hand, more object recognition techniques will be employed into TSR. For example, recognizing objects utilizes heatmaps methods. Finally, more evaluation measures also should be used to estimate the performance of different models.

REFERENCES

[1] Aziz S, Mohamed E, Youssef F (2018) Traffic sign recognition based on multifeature fusion and ELM classifier. Proc Comput Sci 127:146–153.
[2] Jang, C., Kim, H., Park, E., Kim, H. (2016). Data debiased traffic sign recognition using MSERs and CNN. In 2016 International Conference on Electronics, Information, and Communications (ICEIC), Da Nang, Vietnam, pp. 1- 4. https://doi.org/10.1109/ELINFOCOM.2016.7562938.
[3] Lai, Y., Wang, N., Yang, Y., & Lin, L. (2018). Traffic signs recognition and classification based on deep feature learning. In 7th International Conference on Pattern Recognition Applications and Methods (ICPRAM), Madeira, Portugal (pp. 622-629).
[4] Rosario G, Sonderman T, Zhu X. (2018) Deep Transfer Learning for Traffic Sign Recognition[C]//2018IEEE International Conference on Information Reuse and Integration (IRI). IEEE: 178–185. MLA.
[5] Hatolkar, Y., Agarwal, P., & Patil, S. (2018). A Survey on Road Traffic Sign Recognition System using Convolution Neural Network.
[6] Huang, Z., Yu, Y., Gu, J., & Liu, H. (2017). An efficient method for traffic sign recognition based on extreme learning machine. IEEE transactions on cybernetics, 47(4), 920-933.
[7] Li, C., Hu, Y., Xiao, L., Tian, L. (2012). Salient traffic sign recognition based on sparse representation of visual perception. In 2012 International Conference on Computer Vision in Remote Sensing, Xiamen, China, pp. 273-278. https://doi.org/10.1109/CVRS.2012.6421274.
[8] Shi W, Xin L, Yu Z et al (2017) An FPGA-based hardware accelerator for traffic sign detection. IEEETransactions on Very Large Scale Integration Systems 4:1362– 1372. [9] Rosario G, Sonderman T, Zhu X. (2018) Deep Transfer Learning for Traffic signal Recognition[C] 2018 IEEE International Conference on Information Reuse and Integration.
[10] Li, H., Gong, M. (2017). Self-paced Convolutional Neural Networks. In IJCAI, pp. 2110-2116.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details