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.2024.1204348 |

# An Efficient Licence Plate Detection Approach Using Deep Convolutional Neural Network

**S.Sivaranjani, D.Keerthana, S.Poorani, Mrs.K.Banupriya**

UG Student, Dept. of CSE., Sir Issac Newton College of Engineering and Technology, Nagapattinam, Tamil Nadu, India

UG Student, Dept. of CSE., Sir Issac Newton College of Engineering and Technology, Nagapattinam, Tamil Nadu, India

UG Student, Dept. of CSE., Sir Issac Newton College of Engineering and Technology, Nagapattinam, Tamil Nadu, India

Assistant Professor, Dept. of CSE., Sir Issac Newton College of Engineering and Technology, Nagapattinam, Tamil Nadu, India

**ABSTRACT:** Automatic license plate detection is a crucial task in various real-world applications such as traffic management, law enforcement, and parking systems. In this project propose an efficient approach for license plate detection using a combination of the object detection algorithm, YOLOv3, and Optical Character Recognition (OCR) techniques. Our proposed system integrates video processing capabilities to analyze real-time footage from traffic cameras or surveillance systems. The first stage involves employing YOLOv3 for accurate and fast detection of vehicles within the video stream. Subsequently, region-of-interest (ROI) extraction is performed to isolate the license plate regions from the detected vehicles. The next step utilizes OCR algorithms to accurately recognize the characters present on the license plates. This enables us to extract the alphanumeric information necessary for vehicle identification. Furthermore, by incorporating speed detection algorithms, our system can determine the velocity of detected vehicles. One of the key contributions of our approach is its efficiency, achieved through the use of YOLOv3, which enables real-time processing of video streams.Additionally, by employing OCR techniques optimized for license plate recognition, ensure high accuracy in character extraction, even under varying lighting conditions and conclusion.

## I. INTRODUCTION

Traffic management involves the coordination and control of traffic flow to ensure efficient movement of vehicles and pedestrians while minimizing congestion and delays. Traditional traffic management systems rely on fixed timing schedules for traffic signals, which often fail to adapt to real-time changes in traffic conditions. This can lead to inefficiencies, longer travel times, and increased emissions. To address these challenges, enhanced traffic signal management systems leverage advanced technologies such as deep learning and vehicle density computation. By integrating real-time data from various sources such as traffic cameras, and GPS devices, these systems can dynamically adjust traffic signal timings based on current traffic conditions. This enables the optimization of traffic flow by prioritizing high-density areas and minimizing congestion. Furthermore, these systems can predict traffic patterns and trends using historical data and machine learning algorithms. This predictive capability allows for proactive management of traffic flow, such as preemptively adjusting signal timings ahead of anticipated traffic surges or events. Overall, enhanced traffic signal management through deep learning and vehicle density computation offers a more adaptive and efficient approach to traffic control, resulting in reduced travel times, improved air quality, and enhanced overall urban mobility.

| 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.2024.1204348 |

## II. LITERATURE SURVEY

**1.TITLE: Military Vehicle Object Detection Based on Hierarchical Feature Representation and Refined Localization**
**AUTHOR:** Yan Ouyang, Xinqing Wang
**YEAR:** 2022
**OBJECTIVE:**
Excellent detection performance and can better accompblish detection task of military vehicles.

**2. TITLE: Feature Enhancement Based on CycleGAN for Nighttime Vehicle Detection**
**AUTHOR:** Xiaotao Shao, Caike Wei
**YEAR:** 2020
**OBJECTIVE:**
Effectively enhance vehicle features and improve the accuracy of vehicle detection.

**3.TITLE: VAID: An Aerial Image Dataset for Vehicle Detection and Classification**
**AUTHOR:** Huei-Yung Lin; Kai-Chun Tu
**YEAR:** 2020
**OBJECTIVE:**
Training the network using our VAID data set can provide the best vehicle detection result.

**4. TITLE: Optical Character Recognition using KNN on Custom Image Dataset**
**AUTHOR:** Tapan Kumar Hazra
**YEAR:** 2017
**OBJECTIVE:**
Involves application of pattern recognition using KNN to recognize handwritten or printed text

**5.TITLE: Improving Thai Optical Character Recognition using Circular-Scan Histogram**
**AUTHOR:** Natsuda Kaothanthong
**YEAR:** 2018
**OBJECTIVE:**
A circular scan histogram is constructed by rotating the characters during scanning and counting frequencies of each distance

## III. EXISTING SYSTEM

Number plate detection is a critical component in various applications such as traffic management, law enforcement, and automated toll collection systems. In recent years, image processing techniques have gained significant attention for their effectiveness in automating this task. This system presents an image processing-based approach for number plate detection, utilizing techniques such as edge detection, morphological operations, and character segmentation. Through experimentation on diverse datasets, our method demonstrates robustness in detecting number plates under varying lighting conditions, occlusions, and perspectives. Furthermore, this approach achieves better accuracy and efficiency compared to existing methods. However, challenges remain, including the need for
further refinement in handling non-standardized number plate formats, variations in font styles, and real-time processing requirements in dynamic environments.

**Disadvantages:**

- Difficult for image processing algorithms to accurately detect number plates in all cases.
- Image processing techniques may struggle to accurately detect number plates in low-quality or blurry images.
- Image processing algorithms can be computationally intensive, requiring significant processing power and memory resources.

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.2024.1204348 |

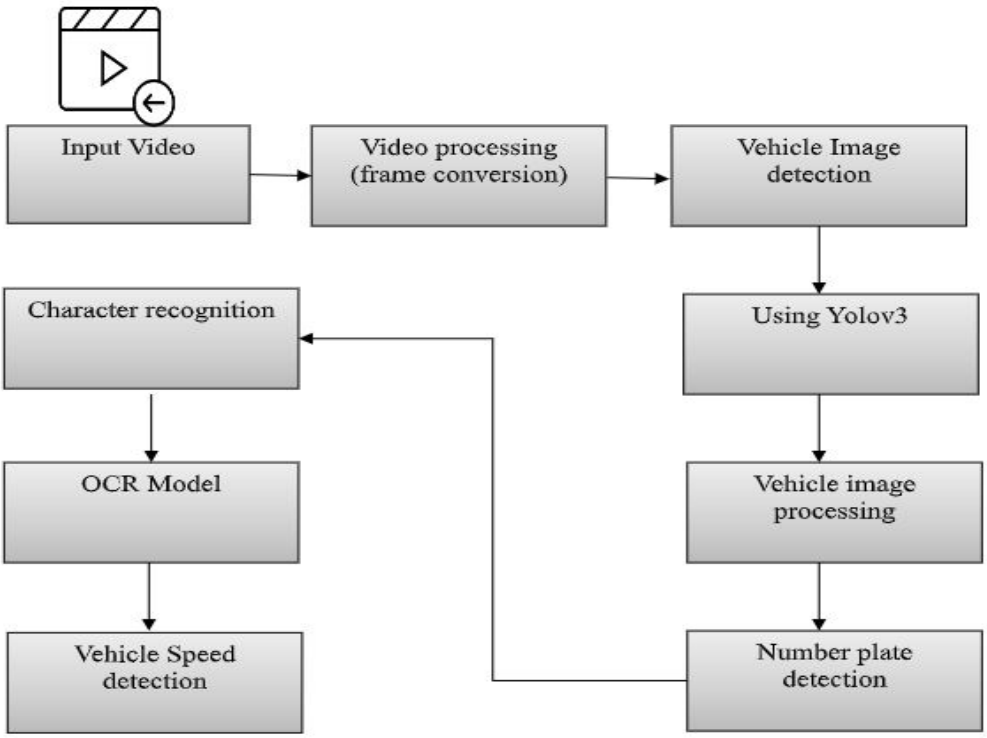
## IV. PROPOSED SYSTEM

The proposed system offers an innovative solution by combining advanced deep learning techniques with video processing capabilities to streamline license plate detection and over-speed vehicle identification. This approach lies YOLOv3 (You Only Look Once), an object detection algorithm renowned for its speed and accuracy. By harnessing the power of YOLOv3, our system can swiftly detect license plates in real-time video streams with remarkable precision, even amidst varying lighting conditions and vehicle orientations. Once a license plate detected, our system seamlessly integrates Optical Character Recognition (OCR) technology. OCR enables the extraction of alphanumeric characters from the detected plates, facilitating rapid and accurate identification of vehicle .This step is crucial for tasks such a tracking traffic violations and monitoring vehicle movements. Moreover, our system goes beyond mere plate detection by incorporating over-speed vehicle identification capabilities. By analyzing the speed of vehicles in conjunction with their detected license plates, our system can flag instances of speeding, enabling prompt enforcement actions to be taken.

### Advantages

- This enables quick identification of vehicles and their license plates which is crucial for applications like traffic monitoring and law enforcement.
- OCR algorithms integrated with YOLOv3 can accurately extract alphanumeric characters from license plates despite variations in size, orientation, and quality.
- Deep learning approaches can be scaled horizontally to process large volumes of video data simultaneously.

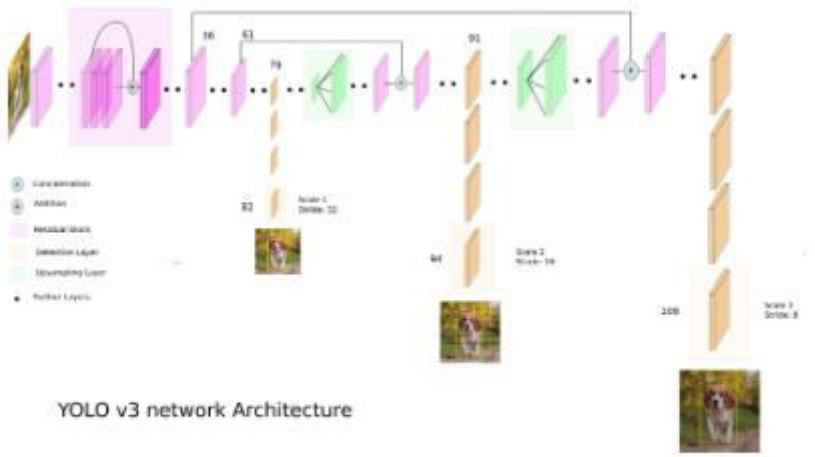
## V. ARCHITECTURE



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

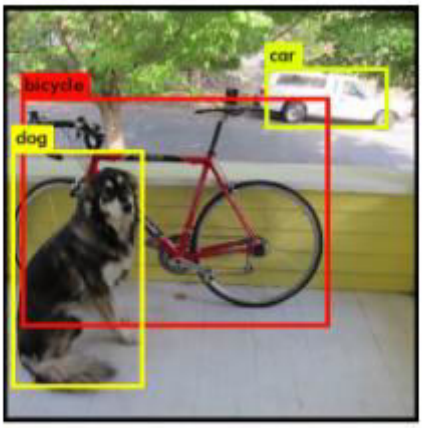
|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204348 |




YOLO architecture

**OBJECT DETCTION**




Object Detection

## VI. CONCLUSION

The implementation of an efficient license plate detection approach utilizing deep neural networks, specifically YOLOv3 combined with OCR, represents a significant advancement in video processing technology. This approach integrates state-of-the-art object detection techniques with optical character recognition to accurately identify and extract license plate information from video streams in real- time. By leveraging the capabilities of deep learning, this method offers several advantages over traditional license plate detection systems. It demonstrates superior accuracy and speed in detecting license plates, even in challenging environments with varying lighting conditions, angles, and vehicle speeds .Furthermore, the integration of OCR enables the extraction of alphanumeric characters from detected license plates, facilitating over-speed vehicle identification and enabling further analysis. The efficiency of this approach makes it suitable for a wide range of applications, including traffic management, law enforcement, and automated toll collection systems. Its real-time processing capabilities empower authorities to swiftly identify and respond to over-speeding vehicles, enhancing road safety and security.

| 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.2024.1204348 |

## VII. FUTURE WORK

In future work analyze video streams from surveillance cameras, this system could not only detect license plates but also track vehicles' movements, allowing for the identification of anomalies or those violating traffic regulations. Incorporating advanced algorithms for speed estimation and trajectory analysis could further refine the system ability to flag instances of speeding, contributing to enhanced road safety and law enforcement efforts.

## REFERENCES

[1] Ouyang, Yan, Xinqing Wang, Ruizhe Hu, Honghui Xu, and Faming Shao. "Military vehicle object detection based on hierarchical feature representation and refined localization." IEEE Access 10, 2022.
[2] Shao, Xiaotao, Caike Wei, Yan Shen, and Zhongli Wang. "Feature enhancement based on CycleGAN for nighttime vehicle detection." IEEE Access 9, 2020.
[3] Lin, Huei-Yung, Kai-Chun Tu, and Chih-Yi Li. "Vaid: An aerial image dataset for vehicle detection and classification." IEEE Access 8, 2020.
[4] Hazra, Tapan Kumar, Dhirendra Pratap Singh, and Nikunj Daga. "Optical character recognition using KNN on custom image dataset." In 2017 8th Annual Industrial Automation and Electromechanical Engineering Conference (IEMECON), IEEE, 2017.
[5] Kaothanthong, Natsuda, Thanaruk Theeramunkong, and Jinhee Chun.
"Improving Thai optical character recognition using circular-scan histogram." In 2017 14th IAPR International Conference on Document.

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