JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

TO DETECT THE NUMBER PLATE BY ENHANCING THE IMAGE

[1]Pritam Ahire, [2]Saiprasad Kadam, [3]Ajay Jagtap, [4]Atharva Jagtap

[1]Professor, [2]Student, [3]Student,[4]Student
[1]Computer Engineering,
[1]Nutan Maharashtra Institute of Engineering and Technology, Pune, India

Abstract : The system called Automatic number plate recognition (ANPR) is used to read information from number plates on objects. The components of ANPR systems include image capture hardware, image processing software, and pattern recognition methods. However, the quality of the picture that is taken is extremely important for ANPR systems' accuracy. Images in real-world situations may be impacted by a variety of elements, including illumination, blur, noise, and occlusion, which can lower the image's quality and result in inaccurate recognition. Therefore, before the input picture is transferred to the ANPR system, image enhancement techniques are crucial for enhancing its quality. Numerous image improvement methods, including noise reduction, contrast enhancement, and picture restoration, have been suggested in recent years to increase the functionality of ANPR devices.This research offers a thorough analysis of the most recent image enhancement methods and how they affect the precision of ANPR systems. The testing findings show that the suggested strategies can greatly increase the ANPR systems' recognition rate.
For smart cities and the Internet of Things, more study into number plate recognition, also known as number plate identification, may be helpful. using image processing techniques. Due to the exponential growth in the number of automobiles, automated systems must be used to store vehicle data for a variety of reasons. A useful approach for detecting Indian licence plates has been developed, and it is recommended. Loud sounds, inadequate illumination, unevenness, and strangely shaped licence plates are all things we can put up with.The per-processing step of this study uses a variety of image processing techniques, including morphological transformation, Gaussian smoothing, Gaussian thresholding, and the Sobel edge detection approach.An enhanced lightweight detection technique for licence plate identification in real-world scenarios was offered as the prior method was inefficient and slow.

Index Terms **- Detection of Number plate, Machine learning(ML), Convolution neural network(CNN), Automatic number plate recognition(ANPR), Vehicle plate detection.**

I. INTRODUCTION

Automatic Number Plate Recognition (ANPR) is a system that extracts data from number plates of moving vehicles. It is widely utilised in many different applications, including parking management, toll collecting, and traffic monitoring. However, the quality of the pictures that are recorded has a significant impact on how accurate ANPR systems are. Problems including poor lighting, motion blur, noise, and occlusion that might decrease the quality of the input image and result in inaccurate recognition are frequently present in real-world circumstances. Before submitting the input image to the ANPR system, image enhancement methods are essential in resolving this problem. These methods try to enhance a picture's visual quality by removing numerous image flaws such noise, blur, and contrast.

The accuracy of ANPR systems has significantly improved as a result of recent developments in picture enhancement techniques. As a result, this study gives an overview of picture enhancing methods and how they affect ANPR system accuracy.

India's long-standing traffic issue has only gotten worse as a result of the country's geometrically expanding population and exponentially rising number of illegal vehicles. There were thus more widespread crimes and traffic jams.

As a result, it's crucial to compel the implementation of a mechanism for swiftly enforcing punishments. To limit access to corporate premises to just permitted cars requires a lot of work and money. We need a reliable and effective approach to quickly extract information from a recorded image of a licence plate. The characters of number plate numbers may be extracted from photos using automatic number plate recognition[7].

The application of ANPR technology has already enhanced intelligent transportation.

The use of systems is replacing interpersonal communication. There are now additional security measures in place in addition to the parking lot barrier and the roadside camera. Several ANPR, Devices were first used in a automobiles, but most recently, as smart-phone technology evolved, they also became portable. It has altered through time to become a mobile device. The toll and parking lot sectors typically adopt ANPR due to its less expensive provisioning.

II. MATERIALS AND METHOD

A web-based ANPR (Automatic Number Plate Recognition) application that uses image enhancement is a system designed to recognize license plates in real-time through a web-based interface. The systems click images of vehicles through a optical sensor(camera) and uses various image processing techniques to detect and recognize license plates accurately[1].

The image enhancement techniques improve the quality of the captured images by reducing noise, blur, and other distortions that may interfere with the recognition process. These techniques include denoising, deblurring, and contrast enhancement to enhance the clarity of the images.

Implementing a web-based ANPR application with image enhancement can help businesses and organizations to have an efficient and streamlined system for traffic monitoring, access control, toll booth ticketing, and surveillance. The system can be integrated with other web-based technologies, such as machine learning and cloud computing, to improve accuracy and performance[1][2].

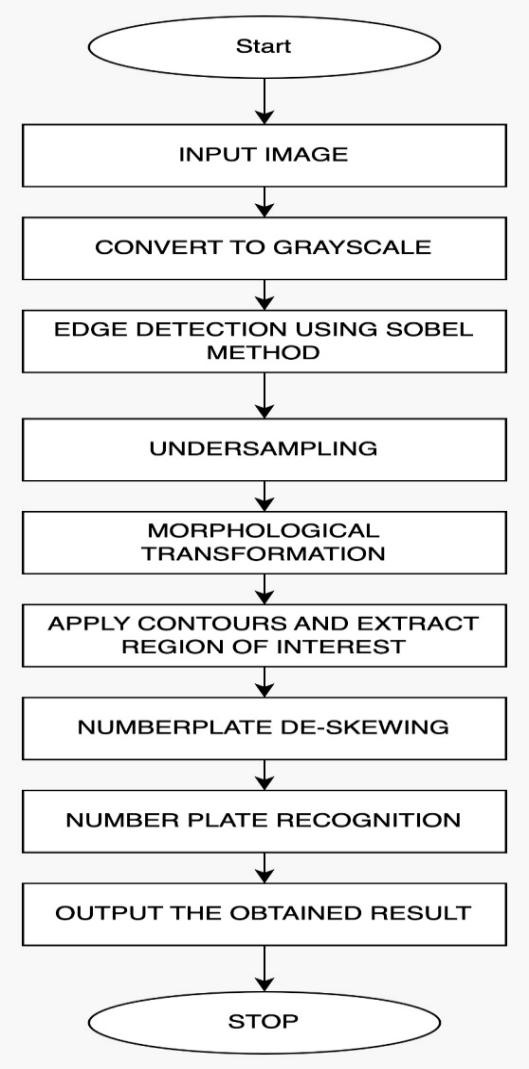

Fig 1 Flow Chart

A use case diagram for an ANPR web app is a graphical representation of the various interactions between users and the system's functionalities. The diagram typically illustrates the actors involved, such as registered users, administrators, and external systems. It may also show specific features like image capture, license plate recognition, and database management. The primary purpose of the diagram is to present a comprehensive overview of the system's operation, highlighting the relationships between actors and system functions.

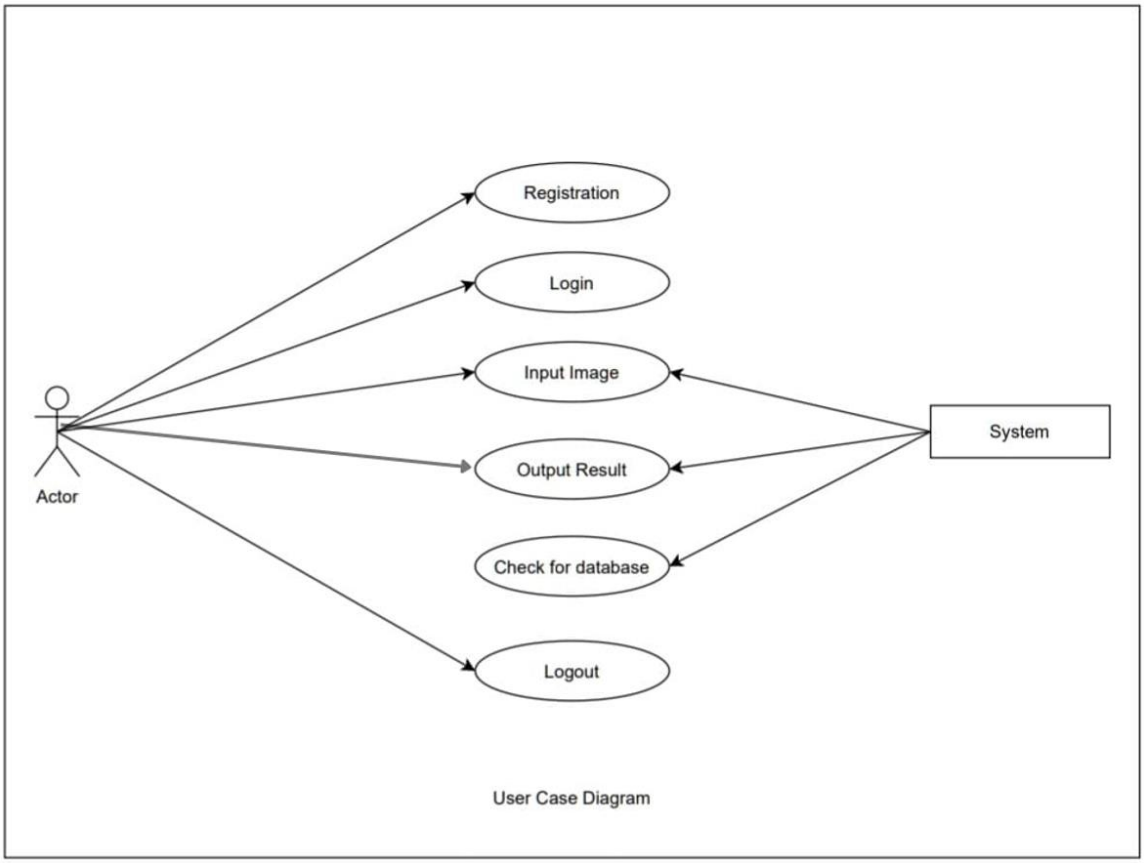

Fig 2 User Case

III. RESULT

The registration page for an ANPR web app is designed for new users to create, an account to access and login into the system. The page typically asks for basic information such as name and email address, as well as a unique username and password. The terms and conditions of use may be presented for users to review and accept before completing registration. Finally, a submit button is available to confirm the registration and create the account.

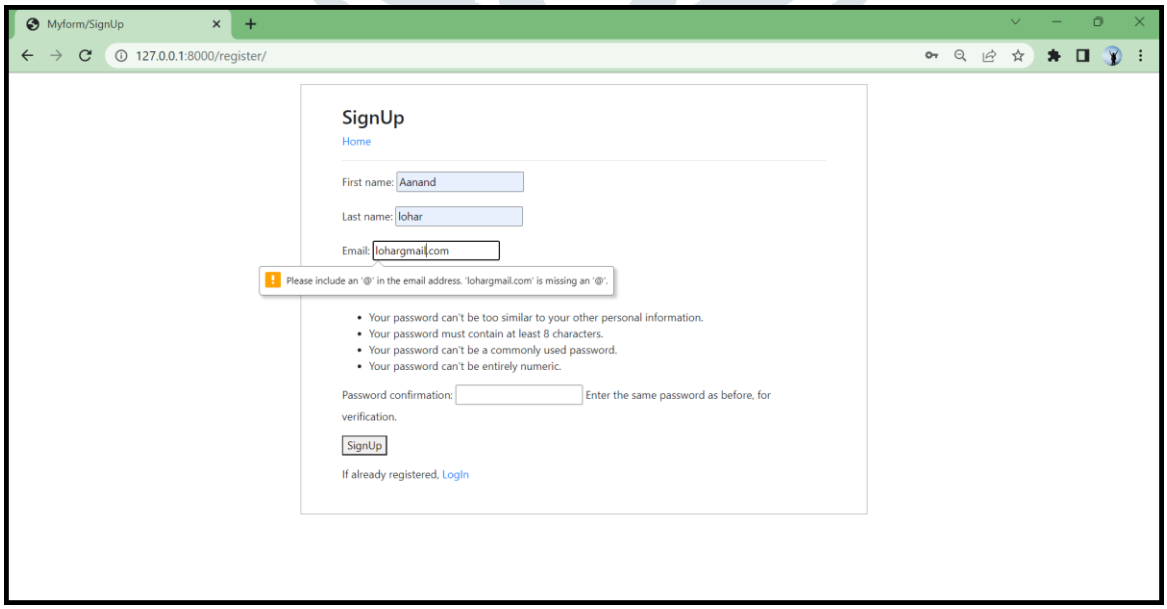

Fig 3 Registration page

The login page for an ANPR web app provides a way for users to verify their identity before accessing the system. It usually contains input fields for entering a unique username and a confidential password. The login button is used to initiate the login process.

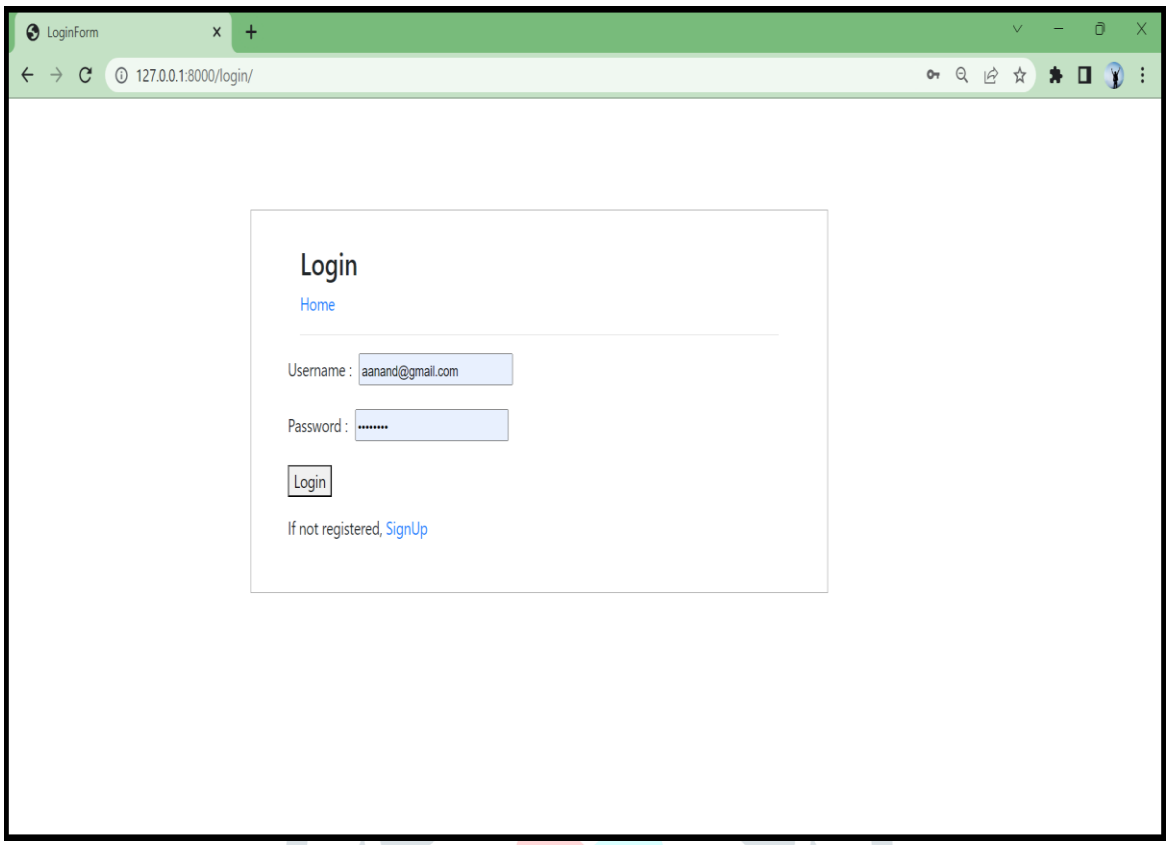

Fig 4 Login Page

The user page of an ANPR web app is the main dashboard where users can access the system's features and functionalities. Finally, a logout button is provided to securely exit the system.

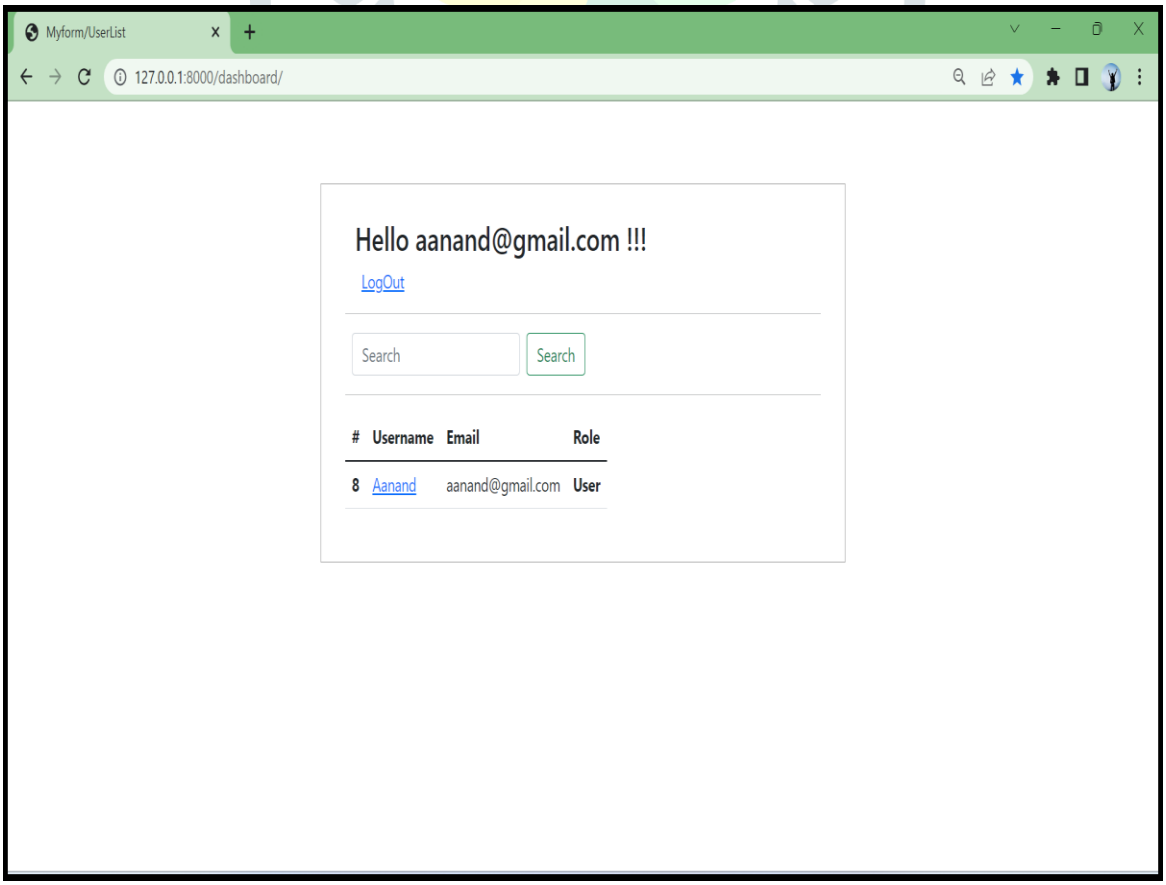

Fig 5 User Page

IV. OUTPUT

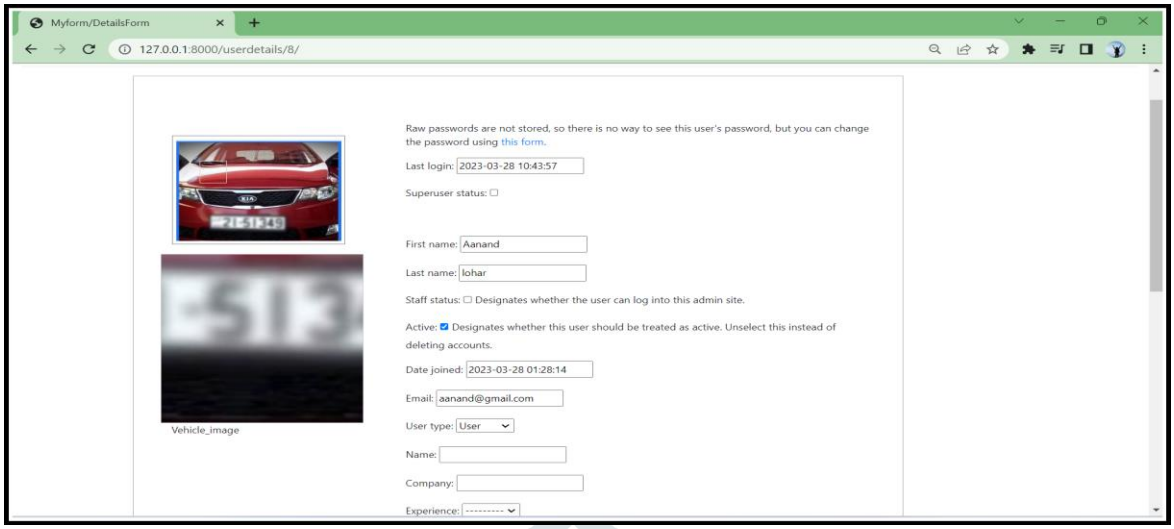

Fig 6 Input/User Details

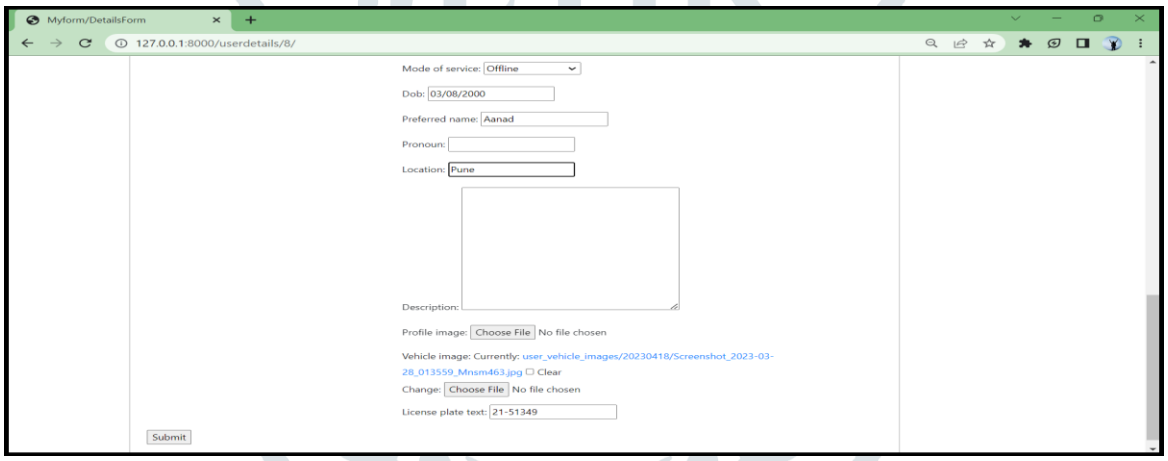

Fig 7 Output

V. CONCLUSION

Technology for automatic license(number-plate) recognition (ANPR). It has become an effective tool in several fields, including law enforcement traffic control, and, parking management. This sophisticated system takes car licence plates and captures using optical sensor, reads and interprets them reliably and effectively using machine learning(ML), and computer vision algorithms. A few advantages of ANPR technology include increased security, better traffic monitoring, and easier parking enforcement. Law enforcement authorities are able to identify suspect cars and then immediately and keep track of their whereabouts to detect and prevent crimes. Additionally, by automatically locating cars that are going above the speed limit, running red lights, or engaging in other traffic infractions, ANPR systems assist in the enforcement of traffic laws.Additionally, parking management systems use ANPR to deliver seamless access control, maximise parking spot utilisation, and support simple payment procedures. Although ANPR(ALPD) technology has many benefits, it is important to address any possible privacy and data protection issues. To guarantee ethical and responsible use of ANPR systems and protect people's rights to privacy while maximising the advantages of this technology, appropriate rules and regulations must be in place.

VI. ACKNOWLEDGMENT

This work was conducted within the Pune University with support from the Nutan Maharashtra Institute of Engineering and Technology, Pune,India.

REFERENCES

1. Lubna; Mufti, N.; Shah, S.A.A." Automatic Number Plate Recognition:A Detailed Survey of Relevant Algorithms". Sensors 2021, 21, 3028.

2. "Vehicle number plate detection using Python and Open CV", AS Mohammed Shariff, Raghav Bhatia, Raghwendra Kuma and Sarthak Jhas, International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), 2021.

3. Alam, N.-A.; Ahsan, M.; Based, M.A.; Haider, J. "Intelligent System for Vehicles Number Plate Detection and Recognition using Convolutional Neural Networks. Technologies"Molecular Diversity Preservation International(MDPI) Vol 9 -1,2021.

4. "Automatic Vehicle Number Plate Recognition System Using Machine Learning" J M S V Ravi Kumar1, B Sujatha2 and N Leelavathi, IOP Conf. Series: Materials Science and Engineering ,CHSN 2021.

5. "A New Approach For Vehicle Number Plate Detection", Sarthak Babbar, Saommya Kesarwani, Navroz Dewan, Kartik Shangle and Sanjeev Patel,Eleventh International Conference on Contemporary Computing IC3 ,2020

6. Thangallapally, S.K.; Maripeddi, R.; Banoth, V.K.; Naveen, C.; Satpute, V.R. E-Security System for Vehicle Number Tracking at Parking Lot (Application for VNIT Gate Security). In Proceedings of the 2018 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 24–25 February 2018; pp. 1–4.

7. "Automated License Plate Recognition: A Surveyon Methods and Techniques", Jithmi Shashirangana, Heshan Padmasiri, Dulani Meedeniya, Charith Perera, Institute of Electrical and Electronics Engineers (IEEE),VOLUME 9, 2021.

8. "License Plate Recognition System Based on Improved YOLOv5 and GRU" HENGLIANG SHI1 AND DONGNAN ZHAO, Institute of Electrical and Electronics Engineers (IEEE), VOLUME 11, 2023.

9. License Plate Localization in Complex Environments Based on Improved GrabCut Algorithm HENGLIANG SHI1 AND DONGNAN ZHAO ,Institute of Electrical and Electronics Engineers (IEEE), VOLUME 10, 2022.

10 Alonso, B.; Po`rtilla, A´.I.; Musolino, G.; Rindone, C.; Vitetta, A. Network Fundamental Diagram (NFD) and traffic signal control: First empirical evidences from the city of Santander. Transp. Res. Procedia 2017, 27, 27–34.

11. "Knowledge Management Academic Research: NUMPATIBILITY- Numeral Era of Compatibility " in Enhancing Academic Research with knowledge Management Principles in IGI Global Disseminator of Knowledge, Dr. Dhananjay S. Deshpande, Dr. Narayan Bhosale, Mr. Rajesh Londhe Year 2017.

12. Predictive and Descriptive Analysis for Healthcare Data, A Hand book on Intelligent Health Care Analytics - Knowledge Engineering with Big Data" A. Jaya (Editor), K. Kalaiselvi (Editor), Dinesh Goyal (Editor), Dhiya Al-Jumeily (Editor)Wiley Group, 2021.

13. "Indigenous Knowledge in Smart Agriculture" Advanced Technologies for Smart Agriculture",Chapter submitted in River Publishers, 2022.

14. Software Project Management SPPU BE IT As per new credit System Syllabus (2019 Course) Savitribai Phule Pune University w.e.f. A.Y. 2022-2023,TechKnowledge Publication.