IJIRCCE

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

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 5, May 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 5, May 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1205350 |

Visitor Vehicle Monitoring System

Tejas Bobade, Gaurav Mulay, Abhishek Dhande, Anushka Roy, Prof. Arunadevi Khaple

Students, Department of Computer Engineering, Zeal College of Engineering & Research, Pune, Maharashtra, India

Assistant Professor, Department of Computer Engineering, Zeal College of Engineering & Research, Pune, Maharashtra, India

ABSTRACT: In a community dealing with issues, like vehicles, excessive paperwork and ineffective visitor management a new approach is proposed using a combination of cameras and smart technology to identify and monitor vehicles. Here's how it functions; A camera positioned at the entrance captures vehicle images. Through algorithms the system scans their license plates eliminating the need for data input. This data is then stored in a database along with entry and exit timestamps providing real time insights into visitor traffic. It doesn't stop there! Visitors now have the option to request access in advance. Upon arrival their license plate triggers an alert to the hosting resident, who can then decide whether to grant entry. This process simplifies operations. Enhances security measures. This innovative system represents an improvement over methods by ensuring precise record keeping bolstering security protocols and offering a more efficient way to oversee vehicle movements, within the community.

KEYWORDS: Character Recognition, Convolutional Neural Network (CNN), Camera, Character Segmentation.

I. INTRODUCTION

Organizations are facing critical difficulties due to a rising number of automobiles such as traffic congestion, lack of security, and poor parking system. Security personnel sometimes have to use conventional verification methods to authenticate vehicles because these systems have been done manually in many cases This is laborious and may lead to errors. Besides, performing records in books and spreadsheets can be undependable which makes the accessibility of important information during emergencies impossible.

The effectiveness and complexity of current vehicle management systems differ whereby some require a great deal of setting up while some others are not reliable enough. In this study, a new approach is proposed that overcomes these limitations by proposing an improved vehicle registration system that is secure and efficient.

This paper describes a new type of car registration and management system for communities that uses Convolutional Neural Networks (CNNs) to detect and recognize license plates. The entry point of the system is equipped with a camera that can capture images of vehicles. Consequently, a CNN-based algorithm can determine promptly the presence of license plates in order to avoid wastage arising from manual data entries. Timestamps for entrance and exit as well as the extracted details on number plates are stored in a database. Additionally, it allows for monitoring real-time vehicle count within a community, which facilitates efficient administration.

Furthermore, this system encompasses visitor management capabilities so that prior access may be granted by visitors whose arrival would automatically trigger an alert through his/her vehicle's number plate to a resident. With residence consent being left or not given depending on who you are, whoever resides at the gate post may grant or refuse permission before one comes in simplifying procedure in case there is a need for letting guests inside. This innovative structure is a significant improvement over manual methods, providing accurate information, improved safety and refined vehicle management among the people. The system increases efficiency and reduces risks of unauthorized entry by automating vehicle tracking and visitor access while providing relevant information useful for better management.

II. LITERATURE REVIEW

1. Doniec and Konior (2023) uses sensors and machine learning to classify both primary (driving) and secondary (distracting) activities of car drivers. It achieves high accuracy, especially for key driving tasks like parking and roundabouts.
2. Mateen and Hanif (2022) proposes a system using "smart roads" equipped with sensors to autonomously detect accidents and warn approaching vehicles, improving safety and reducing the risk of multiple collisions.

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

|| Volume 12, Issue 5, May 2024 ||

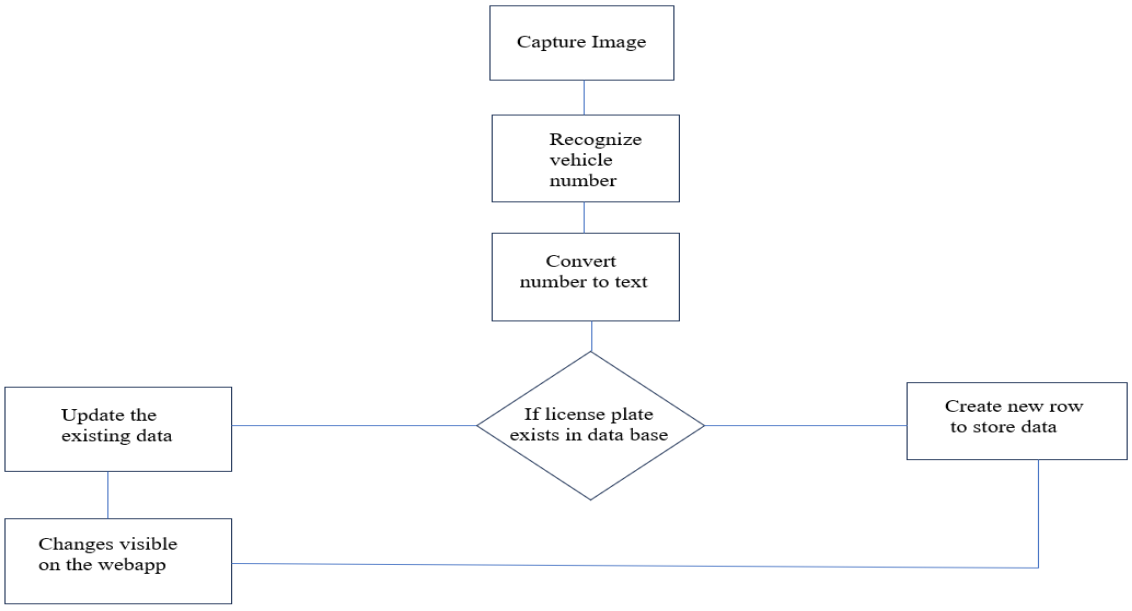
| DOI: 10.15680/IJIRCCE.2024.1205350 |

3. Ortega and Canas (2022) discusses the challenges of creating large-scale multi-camera datasets for driver monitoring systems, crucial for improving advanced driver assistance systems (ADAS) and ultimately, achieving safer roads.
4. Sakthivel and Ashoksrinivash(2022) explores the use of machine learning and deep learning techniques for monitoring driver distraction, aiming to improve road safety and reduce accidents caused by inattentive drivers.
5. Huang He and Dai Shuo proposes a collision detection device for vehicles that uses sound signals instead of traditional methods. This could potentially offer advantages like simpler setup and reduced reliance on visual sensors.
6. Akoz Omer and M. Elif-Karsligil proposes a new method for analysing traffic accidents at intersections using video footage. It focuses on identifying abnormal events by learning normal traffic flow patterns and then analysing partial vehicle trajectories and their motion characteristics.

III. OBJECTIVES

1. Eliminate manual data entry by automatically capturing and recognizing license plates using CNNs, improving efficiency and reducing human error.
2. Prevent unauthorized entry by verifying vehicle identities through license plate recognition, ensuring a safer environment for residents and visitors.
3. Enable residents to grant or deny access to visitors based on their vehicle information, simplifying the process and improving control.
4. Gain valuable data on vehicle occupancy and movement within the society, allowing for better resource allocation and decision-making.
5. Optimize parking allocation and utilization based on real-time vehicle data, reducing congestion and ensuring efficient parking space usage.
6. Facilitate faster and more accurate response to security incidents or emergencies by providing real-time vehicle location information.
7. Ensure reliable and up-to-date information about vehicles entering and exiting the society, minimizing data discrepancies and improving record-keeping.
8. Reduce paper usage and manual record-keeping for a more environmentally friendly system, contributing to a greener society.
9. Provide a convenient and user-friendly experience for residents and visitors, improving overall satisfaction and engagement.
10. Design the system to be scalable and adaptable to accommodate future growth and changes in the society's needs and requirements.
11. Integrate vehicle data with other systems within the society, such as access control systems or parking management platforms, for comprehensive information management.
12. Analyze vehicle data to identify traffic patterns and optimize traffic flow within the society, reducing congestion and improving overall accessibility.

IV. SYSTEM ARCHITECTURE



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

|| Volume 12, Issue 5, May 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1205350 |

1. This step involves capturing an image of a vehicle, likely its license plate, using a camera.
2. The captured image is then processed to recognize the vehicle's license plate number.
3. After recognition, the system converts the extracted vehicle license plate number from an image format into text.
4. The system checks if the recognized license plate number already exists in the database. If it exists, the data associated with the license plate might be updated in the database.
5. If the license plate number is not found in the database, a new row is created to store the data extracted from the image.
6. Finally, the changes made to the data are reflected on the web application.

V. LIMITATIONS

1. The accuracy of the system depends heavily on the performance of the CNN algorithm. Factors like lighting conditions, image quality, and obscured plates can lead to misidentification.
2. The system stores sensitive data like license plate numbers, requiring robust security measures to prevent unauthorized access and data breaches.
3. Collecting and storing vehicle data raises privacy concerns. Clear policies and user consent are crucial for responsible data management.
4. Maintaining the system requires regular updates to the CNN model and database to ensure accuracy and adapt to changing vehicle designs and plate formats.
5. Implementing the system involves initial hardware and software costs, including cameras, servers, and software licenses.
6. Technical issues or power outages can disrupt the system's functionality, requiring backup plans and redundancy measures.
7. Integrating the system with existing access control or parking management systems might require additional development and compatibility testing.
8. The system primarily focuses on license plate recognition and data storage. Additional features for advanced analytics or integration with other systems might require further development.
9. The system relies heavily on technology and infrastructure. Any technical issues or disruptions can impact its functionality.
10. The use of the system for surveillance or tracking purposes raises ethical concerns, requiring careful consideration and responsible implementation.

VI. CONCLUSION

Research proposes a novel vehicle registration and management system for societies. Leveraging CNNs for license plate detection and recognition, the system automates vehicle tracking, enhances security, and streamlines visitor access. By integrating data with resident information, it offers a comprehensive solution for efficient vehicle management within societies. This innovative approach paves the way for a safer, more secure, and data-driven environment for residents and visitors alike.

REFERENCES

1. Doniec, R.; Konior, J.; Sieci ´ nski, S.; Piet, A.; Irshad, M.T.; Piaseczna, N.; Hasan, M.A.; Li, F.; Nisar, M.A.; Grzegorzek, M. Sensor-Based Classification of Primary and Secondary Car Driver Activities Using Convolutional Neural Networks. Sensors 2023.
2. Mateen, A.; Hanif, M.Z.; Khatri, N.; Lee, S.; Nam, S.Y. Smart Roads for Autonomous Accident Detection and Warnings. Sensors 2022
3. Ortega, J.D.; Cañas, P.N.Nieto, M.; Otaegui, O.; Salgado, L. Challenges of Large-Scale Multi-Camera Datasets for Driver Monitoring Systems. Sensors 2022,
4. Sakthivel, K. M. E., Ashoksrinivash, A., & Haarish, T. (2022). Monitoring driver distraction using machine learning and deep learning techniques. International Journal of Health Sciences, 6(S8), 506–516.
5. Huang He, Dai Shuo, Luo Hai, Zhou Heqin , “A Collision Detection Device for Vehicle Based on Sound Signal”, Electronic Technology, V(08), pp: 65-67
6. Akoz Omer, M. Elif-Karsligil , “Video-based traffic accident analysis at intersections using partial vehicle trajectories”, International Conference on Image Processing, ICIP, p 4693-4696

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