

# Video Processing Based Tracking and Vehicle Identification

Pratham N. Surjuse<sup>1</sup>, Shweta G. Deogade<sup>2</sup>, Shantanu S. Deth<sup>3</sup>, Sakshi P. Chahare<sup>4</sup>, Dr. Nitin Janwe<sup>5</sup>

Students, Department of Computer Science & Engineering<sup>1,2,3,4</sup>

Head of Department, Department of Computer Science & Engineering<sup>5</sup>

Rajiv Gandhi College Of engineering Research and Technology, Chandrapur, India

Dr. Babasaheb Ambedkar Technological University, Lonere, Maharashtra, India

**Abstract:** Video surveillance and analysis have become integral components of various domains such as security, traffic management, and urban planning. However, effective tracking and identification of vehicles in video streams remain challenging due to environmental factors, occlusions, and complex motion patterns. This research proposes a novel approach leveraging YOLOv5, a state-of-the-art object detection algorithm, for real-time vehicle tracking and identification. By integrating YOLOv5 with advanced video processing techniques, including preprocessing for enhancing video quality and Kalman filtering for object tracking, the proposed system achieves improved accuracy and robustness in diverse scenarios. Experimental results demonstrate the effectiveness of the approach, showcasing high accuracy in vehicle tracking and reliable identification performance. The findings suggest significant potential for practical applications in enhancing video surveillance systems for better security and traffic management. Additionally, avenues for future research are discussed to further enhance the capabilities of video-based vehicle tracking and identification systems

**Keywords:** Video Processing, Object Detection, YOLOv5, Vehicle Tracking, Vehicle Identification, Deep Learning, Deep Neural Networks, Real-time

## REFERENCES

- [1] Redmon, J., &Farhadi, A. (2018). YOLOv5: An Incremental Improvement. arXiv preprint arXiv:1804.02767.
- [2] Zuraimi, M. a. B. &Zaman, F. H. K. Vehicle detection andtracking using YOLO and DeepSORT.2021 IEEE 11thIEEE Symposium on Computer Applications & IndustrialElectronics(ISCAIE), 2021.IEEE, 23-29.
- [3] Javidi, M. H., Mohammadi, A., Pourreza, H., &Mehrshad, N. (2021). Vehicle detection and classification using YOLOv5. IEEE Access, 9, 115576-115586.
- [4] Alexey Bochkovskiy, Chien-Yao Wang, and Hong-Yuan Mark Liao. (2020) - This paper introduces YOLOv5, which is widely used for object detection tasks.
- [5] Davis, J., &Goadrich, M. (2006). The relationship between Precision-Recall and ROC curves. In Proceedings of the 23rd international conference on Machine learning (pp. 233-240).
- [6] Goodfellow, YoshuaBengio, and Aaron Courville. (2016) - Chapter 11 of this book covers performance evaluation in deep learning models on training and validation datasets, overfitting, and techniques for improving generalization.
- [7] Liu, J., Yao, X., Wang, S., & Zhang, Y. (2022). Real-Time Vehicle Detection and Recognition from High-Resolution Videos.IEEE Transactions on Intelligent Transportation Systems.