| **No.** | **Title** | **Authors** | **Year** | **Methodology** | **Key Contributions** | **Limitations** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Edge ML Technique for Smart Traffic Management in Intelligent Transportation Systems | A. Hazarika et al. | 2024 | Edge computing with YOLO for vehicle detection | Real-time traffic density estimation, reduced latency, optimized traffic flow | High computational overhead, scalability issues, accuracy in varying conditions |
| 2 | Adaptive Traffic Control System Using YOLO | Sirphy S, S. Thanga Revathi | 2023 | YOLO algorithm for adaptive signal control | Reduces congestion by adjusting signal timings based on vehicle count | Performance degrades in high-density traffic, lacks pedestrian management |
| 3 | Dynamic Traffic Signal Control Using Deep Reinforcement Learning | J. Lee, K. Park | 2020 | Deep Reinforcement Learning (DRL) for traffic signal optimization | Adaptive to real-time data, improves traffic flow over static systems | High computational requirements, data-intensive training, risk of overfitting |
| 4 | Real-Time Traffic Flow Estimation Using Deep Learning and Computer Vision | A. Sharma, B. Reddy | 2021 | Deep learning models for vehicle detection and counting | High accuracy in traffic flow estimation, improves real-time monitoring | Requires significant computational resources, not evaluated under diverse weather conditions |
| 5 | Dynamic Traffic Light Control Using Fuzzy Logic and IoT | M. Carini, L. Ricci | 2019 | Fuzzy logic algorithms integrated with IoT devices | Improved traffic flow efficiency, adaptable to different traffic conditions | Limited scalability, dependent on IoT infrastructure availability |
| 6 | Real-Time Object Detection for Traffic Monitoring Using YOLO Algorithm | M. Chen, Y. Wang | 2021 | YOLO for real-time object detection in traffic monitoring | Effective in detecting multiple vehicle types, real-time application feasibility | Performance decreases in low-light conditions, challenges in detecting small objects |
| 7 | Intelligent Transportation Systems Using Edge Computing and Machine Learning | P. Kumar, R. Gupta | 2021 | Edge computing and ML models for traffic management | Low latency in decision-making, decentralized control, energy-efficient solutions | Edge devices have limited processing power, potential data privacy issues |
| 8 | AI-Driven Traffic Management for Urban Networks | G. Zhang, F. Yu | 2020 | AI algorithms for optimizing urban traffic networks | Enhances coordination among traffic signals, reduces overall congestion | Requires integration with existing traffic management systems, high implementation cost |
| 9 | Vehicle Detection and Classification Using Deep Learning | S. Patel, T. Nguyen | 2020 | CNN models for vehicle detection and classification | High accuracy in detecting and classifying vehicles, robust under various conditions | Computationally intensive, potential false positives under certain environmental conditions |
| 10 | A Survey on AI-based Traffic Signal Control Systems | M. Johnson, E. Williams | 2021 | Survey of AI techniques in traffic management | Comprehensive overview of current AI applications in traffic control | Limited to a review of existing literature, does not provide new experimental data |
| 11 | Smart Traffic Light System Using Convolutional Neural Networks | A. Rivera, M. Olson | 2019 | CNN-based model for dynamic traffic light control | Reduces congestion and improves traffic flow through adaptive signal changes | Requires significant training data, potential integration challenges with existing traffic systems |
| 12 | Traffic Signal Optimization Using Reinforcement Learning | D. Brown, H. Lin | 2020 | Reinforcement Learning for traffic signal optimization | Effective in reducing vehicle idle times and optimizing traffic light phases | High computational cost, requires substantial historical traffic data for training |
| 13 | YOLO-Based Object Detection for Traffic Flow Optimization | X. Li, H. Zhang | 2022 | YOLO-based detection for optimizing traffic flow | Real-time traffic management, adaptable to changing traffic densities | Performance issues in crowded scenes, requires high-quality camera feeds |
| 14 | Implementation of Smart Traffic Lights Using IoT and AI | N. Singh, R. Verma | 2021 | IoT and AI for smart traffic light control | Integrates IoT with AI for dynamic traffic control, enhances response times | Dependent on IoT network stability, potential cybersecurity threats |
| 15 | Traffic Flow Prediction Using Machine Learning Techniques | K. Martinez, J. Choi | 2018 | Machine learning models for predicting traffic flow | High accuracy in short-term traffic prediction, useful for proactive signal control | Less effective for long-term predictions, sensitive to data quality and availability |