

Leveraging Automated and Connected Vehicles with Deep Learning for Smart Transportation Network Optimization

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Abstract : The advent of automated and connected vehicles has revolutionized the transportation industry, presenting new opportunities for enhancing the efficiency, safety, and sustainability of our transportation networks. This paper explores the integration of automated and connected vehicles into a smart transportation framework, leveraging the power of deep learning techniques to optimize the overall network performance. The first aspect addressed in this paper is the deployment of automated vehicles (AVs) within the transportation system. AVs offer numerous advantages, such as reduced congestion, improved fuel efficiency, and increased safety through advanced sensing and decisionmaking capabilities. The paper delves into the technical aspects of AVs, including their perception, planning, and control systems, highlighting the role of deep learning algorithms in enabling intelligent and reliable AV operations. Furthermore, the paper investigates the potential of connected vehicles (CVs) in creating a seamless communication network between vehicles, infrastructure, and traffic management systems. By harnessing real-time data exchange, CVs enable proactive traffic management, adaptive signal control, and effective route planning. Deep learning techniques play a pivotal role in extracting meaningful insights from the vast amount of data generated by CVs, empowering transportation authorities to make informed decisions for optimizing network performance. The integration of deep learning with automated and connected vehicles paves the way for advanced transportation network optimization. Deep learning algorithms can analyze complex transportation data, including traffic patterns, demand forecasting, and dynamic congestion scenarios, to optimize routing, reduce travel times, and enhance overall system efficiency. The paper presents case studies and simulations demonstrating the effectiveness of deep learning-based approaches in achieving significant improvements in network performance metrics

Keywords : automated vehicles, connected vehicles, deep learning, smart transportation network

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