Chapter 12
Smart Cities on the Move Leveraging IoT Communication in Connected Cars for Enhanced Traffic Management

Manikandan Arunachalam
https://orcid.org/0000-0003-0461-2859
Department of Electronics and Communication Engineering, Amrita Vishwa Vidyapeetham, India

A. Abhiram
Department of Electronics and Communication Engineering, Amrita Vishwa Vidyapeetham, India

Vaishnav Raj
Department of Electronics and Communication Engineering, Amrita Vishwa Vidyapeetham, India

Rakesh Thoppaen Suresh Babu
https://orcid.org/0009-0003-2671-4618
Fiserv Inc, Alpharetta, USA

ABSTRACT

The integration of Connected Cars in Smart Cities marks a significant shift in urban mobility, accelerated by the Internet of Things (IoT) communication infra-

DOI: 10.4018/979-8-3693-6422-2.ch012

structure. Cars on the road collectively function as distributed networks of sensors, continuously gathering diverse data types. Vehicles have long been equipped with various sensors, from multi-purpose cameras to infrared and GPS systems, enabling comprehensive data collection. With the advent of Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) communication techniques, data exchange between vehicles becomes feasible, allowing comparative analysis and integration to enhance situational awareness on the road. This paper investigates the potential applications of integrated vehicle data and augmented reality techniques in traffic management, leveraging real-time exchange to mitigate congestion, enhance safety, and optimize transportation systems, also applications of these augmented reality techniques in enhancing traffic management, reducing accidents, and optimizing transportation systems within Smart Cities.

INTRODUCTION

Nowadays, IoT transformation in urban projects has given the solution of smart cities a new perspective. Of all the cases of using IoT in urban environments, the connected car is an innovation that has a huge impact on society(Cvar et al. 2020). These linked vehicles are somewhat more than vehicles for traveling; they are systems composed of several sensing, controlling, and signalizing systems in mutually connected automotive vehicles as well as potentially with other objects in the city(Deng et al. 2023). This integration holds the potential to enhance the safety, effectiveness, and environmentally friendly nature of urban mobility and consequently, the design of sprightlier and better-suited lifestyles. The growth of IoT technology has however been rampant coupled with progression in vehicle-to-everything (V2X) connectivity, making it possible for connected cars to seamlessly integrate with the city environment. These are the essential components of the concept of smart technologies, sensor fusion, and independent analysis of the data obtained in real-time in connected car systems. Automotive connectivity advances, particularly with linked automobiles, have propelled the automobile sector forward to levels of technology and integration(Bučko et al. 2021). Integral to these calls is the use of IoT devices, smart sensors, and enhanced communication systems that hold the capability of enabling cars to actively communicate with other cars, the physical environment, and infrastructure in real-time(Vermesan et al. 2020). V2X communication points to new temporary traffic control and the provision of safe roads with little probability of an accident, on the other hand, sensor fusion means using many sensors to provide a complete view of the driving landscape(Adnan Yusuf, Khan, and Souissi 2024; Teixeira et al. 2023). The concept of connectivity, edge computing, and cloud integration along with the ability to process data