Chapter 5
Integrating Cloud Computing for Intelligent Transportation Solutions in Smart Cities: A Short Review

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ABSTRACT

Urban transportation systems face many challenges, such as traffic congestion, pollution, and inefficient infrastructure. To tackle these problems, cities are increasingly adopting cloud-based smart transportation solutions. These solutions use cloud

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computing to integrate IoT devices, data analytics, and real-time monitoring, optimizing urban mobility. Cloud platforms allow for efficient data collection, storage, and analysis, helping city authorities make informed decisions. This approach is scalable, flexible, and cost-effective, promoting smarter and more sustainable urban transportation systems. By leveraging cloud computing, cities can improve traffic management, reduce congestion, and enhance decision-making, leading to better efficiency, sustainability, and safety. The proposed model for smart transportation involves using cloud computing, IoT, data analytics, and advanced AI algorithms to create more connected and livable urban environments.

INTRODUCTION

Modern cars are equipped with an exorbitant number of sensors, actuators, and communication devices; mobile phones or GPS units in particular can contextually shift from being a simple phone to becoming embedded computers inside the vehicle. More specifically, multiple types of vehicles receive strong sensing, networking, and communication powers with processing capabilities. The data exchanged among vehicles or with the external world can be done using various application layer protocols like TCP/IP, SMTP, WAP, and most importantly, the Next Generation Telematics Protocol (NGTP), specifically mentioned in this ETSI standard document (Arthurs et al., 2022). Accordingly, many of the most innovative telematics services have been designed and developed to advance convenience, fun, and safety for drivers—e.g., remote security: car detecting/engine disabling, etc. (Dankovtsev et al., 2022). Heavy traffic, congestion, and safety of vehicles are getting worse with the passage of time, but cloud computing complexity aspects together with the Internet of Things (IoT) have provided a chance to solve this structural issue in an encouraging way. Over the past years, several models for deploying cloud-based intelligent transportation systems (ITSs) have been created by researchers. As an example, ITS-Cloud was developed as a replacement conveyance cloud idea to boost road safety and vehicle-to-vehicle communication.

Intelligent Transport Systems (ITS) combine the advances of many IT applications with innovative communication technology to achieve more efficient traffic management and, therefore, offer better transportation services. They help to avoid some possible accidents and traffic jams, which are caused in part by population growth and have additional negative effects such as longer travel times, air pollution, or increased fuel usage (Geng et al., 2024). To find a ubiquitous solution, ITS organizations have been working on traffic communications and vehicular networking for a while. For example, the 5.850-5.925 GHz band has been reserved by the FCC in the US for DSRC spectrum, providing up to 75 MHz of bandwidth exclusively