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Review of Machine Learningbased-Based Methods in Intelligent Transportation Systems

Maide Betul Aksoy , Burcu Yengil Bülbül

Emine Bilek, Turkey

Abstract

The increase in the population living in cities and the number of motor vehicles causes problems such as environmental problems, noise pollution, lack of resources and traffic accidents. Intelligent Transportation Systems (ITS) seek solutions to these problems and include many services and applications, from the management of road traffic flow to passenger information networks, from the coordination of public transportation operations to autonomous vehicle technologies. In the future, ITS is expected to become a cornerstone of urban planning and the smart city vision. These systems aim to increase road and traffic safety, make transportation and public transportation more efficient, and reduce environmental pollution by reducing energy consumption. Building the sustainable and intelligent transportation systems of the future is possible through the comprehensive use of IoT infrastructures and the seamless integration of information and communication technologies. The implementation of the latest communication, electronic, and computing technologies enables the instantaneous and reliable sharing of data, the dynamic management of traffic flow, and the efficient optimization of transportation networks. This study aims to contribute to both academic literature and practical applications by examining the current and potential use of machine learning-based solutions in ITS. There are examples where some countries have turned problems such as traffic light control, accident detection, traffic congestion, and parking into efficient solutions with machine learning. This study compiles scattered information from the literature and offers a comprehensive framework at the intersection of ITS and machine learning. Thus, this study not only contributes to the academic body of knowledge but also serves as a strategic guide for the development of smart cities.

Accident detection; Machine learning; Parking; Route optimization; Traffic lights

Keywords: Accident Detection; Machine Learning; Parking; Route Optimization; Traffic Lights