

Optimization of Smart City CO₂ Emission Reduction Plans Using Machine Learning Algorithms

Narcisa Zlatan, Lima Hongou, Sofia Arkhstan

1. Polytechnic University of Bucharest, Management Technology department, Romania
2. Faculty of Engineering, Computer Technology, UCSI University, Kuala Lumpur 56000, Malaysia
3. Department of Computer System, South Ural State University, 454080 Chelyabinsk, Russia

Abstract:

As urbanization accelerates, smart cities face mounting challenges related to environmental sustainability, particularly in reducing carbon dioxide (CO₂) emissions. This study presents a machine learning-based framework to optimize emission reduction plans tailored for smart cities. By leveraging real-time environmental data collected from IoT sensors and city infrastructure, various machine learning algorithms—such as decision trees, support vector machines, and ensemble methods—are applied to model emission patterns and forecast pollution levels. These predictive models are then used to identify high-impact intervention strategies, such as traffic flow adjustments, energy-efficient infrastructure upgrades, and policy modifications. The integration of machine learning not only enhances the accuracy of emission forecasting but also enables data-driven planning for sustainable urban development. The results demonstrate the potential of intelligent systems in achieving measurable reductions in CO₂ emissions while supporting long-term ecological goals.

Keywords:

Smart cities, CO₂ emissions, machine learning, sustainability, optimization, environmental monitoring.

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