

Abstract

The rapid urbanization and population growth in cities have led to significant commuting challenges, including traffic congestion, pollution, and inefficient public transportation systems. Smart cities aim to leverage advanced technologies to create efficient, sustainable, and livable urban environments. This research explores the potential of Artificial Intelligence (AI), the Internet of Things (IoT), and Machine Learning (ML) algorithms in addressing commuting problems in smart cities.

The study begins with a comprehensive review of existing literature on smart cities and their transportation challenges. It then delves into the technological frameworks that underpin smart city infrastructure, emphasizing the synergistic role of AI, IoT, and ML. AI and ML algorithms can analyze the data to predict traffic congestion, and enhance public transportation routes.

The core of the research involves compare and test various AI and ML models to solve traffic congestion issues. This comparative study examines the performance of nine machine learning algorithms in addressing traffic congestion problems within a smart city context. The research evaluates these algorithms across a range of performance parameters and error measures to identify their effectiveness in optimizing transportation systems and enhancing commuter experiences. By employing diverse datasets representative of urban commuting patterns, the study aims to provide insights into the strengths and weaknesses of each algorithm in predicting traffic flow, optimizing routes, and minimizing congestion.

The selected algorithms encompass a variety of approaches, including supervised, and reinforcement learning techniques, enabling a comprehensive analysis of their applicability to real-world commuting scenarios. Evaluation metrics such as accuracy, precision, recall, F1-score, and Mean Absolute Error (MAE) are employed to assess algorithm performance under varying conditions and datasets. Through this comparative analysis, the study aims to contribute to the development of more efficient and reliable transportation management systems in smart cities, ultimately improving the quality of life for urban residents.