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Reducing CO2 Emission Using EDA and Weighted Sum Model in Smart Parking System

Authors : Rahman Ali, Muhammad Sajjad, Farkhund Iqbal, Muhammad Sadiq Hassan Zada, Mohammed Hussain

Abstract : Emission of Carbon Dioxide (CO₂) has adversely affected the environment. One of the major sources of CO₂emission is transportation. In the last few decades, the increase in mobility of people using vehicles has enormously increased the emission of CO₂ in the environment. To reduce CO₂ emission, sustainable transportation system is required in which smart parking is one of the important measures that need to be established. To contribute to the issue of reducing the amount of CO₂emission, this research proposes a smart parking system. A cloud-based solution is provided to the drivers which automatically searches and recommends the most preferred parking slots. To determine preferences of the parking areas, this methodology exploits a number of unique parking features which ultimately results in the selection of a parking that leads to minimum level of CO₂emission from the current position of the vehicle. To realize the methodology, a scenario-based implementation is considered. During the implementation, a mobile application with GPS signals, vehicles with a number of vehicle features and a list of parking areas with parking features are used by sorting, multi-level filtering, exploratory data analysis (EDA, Analytical Hierarchy Process (AHP)) and weighted sum model (WSM) to rank the parking areas and recommend the drivers with top-k most preferred parking areas. In the EDA process, “2020testcar-2020-03-03”, a freely available dataset is used to estimate CO₂emission of a particular vehicle. To evaluate the system, results of the proposed system are compared with the conventional approach, which reveal that the proposed methodology supersedes the conventional one in reducing the emission of CO₂into the atmosphere.

Keywords : car parking, Co2, Co2 reduction, IoT, merge sort, number plate recognition, smart car parking
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