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*Reinforcement Learning Optimization of Placement of Public Vehicle Charging Stations using a Novel Parking Demand Model*

**Abstract:** As environmental concerns escalate, people and governments become more interested in plug-in electric vehicles (EVs) to mitigate carbon emissions. Widespread optimized locations of charging stations, which support existing EVs and promote their adoption, is impeded by the lack of travel survey data that prior research relies on. This study creates a novel parking demand model based on publicly available features in OpenStreetMap, rather than proprietary or non-existent travel survey data. The demand model was then successfully implemented into a Reinforcement Learning (RL) model that optimizes the placement and capacity of charging stations in the target region by considering financial constraints, parking demand, and user convenience. Analysis of the RL model in urban versus rural regions revealed that dense urban networks are a double edged sword: its optimized plan of chargers is more accurate than rural networks in real-world applications, yet they require more computational power due to the increased possible number of placement combinations. This research expands the scope of charging placement optimization to the global scale by creating a flexible tool using open data for future research in this area of study.