

Computer Simulation for Load Balancing in EV Charging Stations Network

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Abstract

Electric vehicles (EV) are promising to become one of the most economically and environmentally viable transportation alternatives. Increasing gas prices, improvement of EV technologies and government policies supporting EV infrastructure development account for the rapid growth of electric transport. In this paper we present an approach to solve the load balancing problem in EV Charging Stations (EVCS) network, which will help network owners make most profit. Our methodology is the recommendation system that analyses EVCS customers' routes and balances the load on stations by motivating customers to charge their EVs at places with lower loads in terms of number of people at particular station. We use city simulation software to get the locations of charging stations and drivers' locations and routes. Based on that, we develop a mathematical model to calculate an optimal charging station for each customer taking into account routes of all customers. Web-based solution is developed to do the calculations and visualize the results. The solution is tested on artificial data from the simulation software to prove the efficiency of the implemented mathematical model and technical solution.

Keywords

Simulation, electric vehicle, charging station, network balancing, Internet of Things