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An Optimal Scheduling Algorithm for Hybrid EV Charging Scenario using Consortium Blockchains

Xiaohong Huang[a], Yong Zhang[a], Dandan Li[a,*], Lu Han[a]

[a]*Institute of Network Technology, Beijing University of Posts and Telecommunications, Beijing, China*

Abstract

In this paper, we propose an optimal charging scheduling algorithm for hybrid vehicle charging scenarios. Unlike traditional charging scheduling algorithms, which only consider the vehicle-to-vehicle (V2V) and grid-to-vehicle (G2V) scenarios, the new and hybird charging scenario including the emerging mobile charging vehicles (MCV), i.e., mobile charging vehicle-to-vehicle (MCV2V), G2V and V2V is considered in this paper. Moreover, the proposed optimal charging scheduling framework based on consortium blockchains ensures the security and privacy of electricity trading. The proposed scheduling algorithm is based on a double-objective optimization model aiming at maximizing user's satisfaction and minimizing users' cost, while considering diverse metrics like location of charging and discharging entities, the time of waiting, and driving speed of EVs, etc. In order to solve the optimization model, an improved Non-dominated Sorting Genetic Algorithm (NSGA) is proposed. Experiments based on the real map of Beijing is done to evaluate the performance of proposed scheduling algorithm. The results show that the proposed algorithm can acnieve better performance in terms of user's satisfaction and user's cost comparing with V2V based algorithm and G2V based algorithm.

Keywords: Optimal Scheduling, Energy Internet, Consortium Blockchain, Energy Charging

*Corresponding author at: Institute of Network Technology, Beijing University of Posts and Telecommunications, Beijing, China
E-Mail Address: dandl@bupt.edu.cn