学院新闻

学院汤强博士论文被CCF A类期刊录用

发布时间: 2020-06-15 18:39:39 浏览量: 371

2020年6月13日，计算机与通信工程学院汤强老师作为第一作者，罗元盛老师作为合作作者的论文被《IEEE Transactions on Parallel and Distributed Systems》录用，该期刊是并行与分布式计算领域的顶级期刊，录用的论文主要集中在“并行与分布式算法”、“并行与分布式计算应用”、“并行与分布式结构”、“并行与分布式软件”四个方面，该期刊是中国计算机学会（CCF）指定的A类学术期刊。

该论文“Congestion-balanced and Welfare-maximized Charging Strategies for Electric Vehicles” 主要研究了智慧城市中的电动汽车充电网络优化问题。通过考虑充电站拥塞、发电成本、电动汽车用户的充电满意度、电动汽车充电所需的行驶距离成本、充电价格等多种因素，建模该问题为社会效用最大化问题，可在均衡充电站拥塞水平的前提下，最大化充电网络中所有参与实体的效用和。在优化模型求解过程中，为了进一步考虑电动汽车用户的隐私安全，论文还提出了分布式求解算法。该论文是继2017年Globecom（IEEE通信旗舰会议之一）上发表的论文“Congestion Balanced Green Charging Networks for Electric Vehicles in Smart Grid”的延续。

Congestion-balanced and Welfare-maximized Charging Strategies for Electric Vehicles

Qiang Tang, Kezhi Wang, Kun Yang, *Senior Member, IEEE,*, Yuan-sheng Luo

***Abstract*—With the increase of the number of electric vehicles (EVs), it is of vital importance to develop the efficient and effective charging scheduling schemes for all the EVs. In this paper, we aim to maximize the social welfare of all the EVs, charging stations (CSs) and power plant (PP), by taking into account the changing demand of each EV, the changing price, the capacity and the congestion balance between different CSs. To this end, two efficient scheduling algorithms, i.e., Centralized Charging Strategy (CCS) and Distributed Charging Strategy (DCS) are proposed. CCS has a slightly better performance than the DCS, as it takes all the information and make the decision in the central control unit. On the other hand, DCS dose not require the private information from EVs and can make decentralized decision. Extensive simulation are conducted to verify the effectiveness of the proposed algorithms, in terms of the performance, congestion balance and computing complexity.**

***Index Terms*—Social Welfare Maximization, Congestion Balance, Charging Strategy, Electric Vehicle.**

I. Introduction

With the increase of greenhouse effect, many countries have set policies and developed several projects to improve the penetration of EVs in their daily lives. In the past ten years, the global stock of battery electric vehicles (BEVs) has passed more than 5 million, with the growth rate 63% from the previous year [1]. It is foreseen that the number of EVs will break

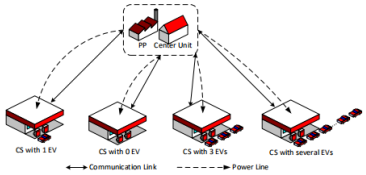

Fig. 1. Unbalanced charging problem.

- Unbalanced service time of charging stations: In general, the CSs with the heavy charging load cost more time for charging all the queued EVs compared to the CSs with less charging load.
- Wasting of resources: Unbalanced service time causes some CSs overloaded and others underutilized in the long term, which wastes the charging resources for all the EVs.
- Additional investment: Unbalanced charging load among CSs may result in the administrative department to build more CSs or expand the capacity of existing CSs to avoid congestion.

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