

DISTRIBUTED AND PRIVATE ALLOCATION OF RESOURCES FOR ELECTRIC VEHICLE CHARGING

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BACKGROUND

Government efforts to focus on renewable energy sources are slowly leading to the adoption of electric vehicles (EVs). Accordingly, the EV charging station market is projected to reach US\$19.97 billion by 2023 (according to Business Wire). In the U.S. alone, it was reported by the Electric Vehicle Charging Association that there were more than 50,000 public and private charge points in operation in 2017 and that a major growth is expected over the next few years. Despite this growth, the increased number of EVs in circulation will lead to a difficulty: these vehicles take a long time to charge, potentially engorging the network. Moreover, finding an available charging station with minimum detour, reserving it, and completing the transaction may become a tedious task for drivers.

In response to this problem a largescale communication system between electric vehicles and unused charging plugs is needed, and a solution has been developed by Concordia University.

TECHNOLOGY

The technology is a distributed and private algorithm proposed as a solution to a problem of allocation of resources, such as found in an area with limited number of EV charging stations. This algorithm solves two main issues:

- the matching problem in which EVs are looking for a charging station and where a mechanism is required to efficiently match each EV to a charging station.
- the power allocation problem in which a distributed algorithm is used for efficient power allocation. Here the algorithm that is applied on behalf of each EV owner determines the optimal amount of charge to provide to each EV.

COMPETITIVE ADVANTAGES

- Algorithm based on distributed resource allocation determines the optimal allocation of resources. The proposed solution requires minimum communication while being very efficient.
- Distributed algorithm ensures privacy of users' data.

APPLICATIONS

- Optimization of electricity allocation in EV charging station networks
- Optimization of allocation of any resource that needs to be shared between many users

TECHNOLOGY DEVELOPMENTAL STAGE

- Mathematical method fully developed
- Proof of concept being tested with communication system, real dual charging station, two real EVs, multiple virtual EVs and multiple virtual charging stations

BUSINESS OPPORTUNITY

Patent pending technology available for partnering or licensing opportunities

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