Discussion of the Key Technology and Application of Big Data Platform for New Energy Vehicles and V2X

Xiaolei Wang, Gang Wang, Hailong Wang, Yunfeng Cao* and Zhitan Li
Marketing Service Center, State Grid Xinjiang Electric Power Co, LTD, P.C.83000.

*Corresponding author e-mail: yunfeng-cao@sgcc.com.cn

Abstract. With the development of the economy and social progress, China's science and technology industry has made remarkable breakthroughs and progress. New energy vehicles began to appear in people's lives and gain popularity, in which context, a big data platform about new energy vehicles and V2X (vehicle-to-everything) emerged. Meanwhile, the state regulation of new energy vehicles has been improved. Whether it is new energy vehicles or V2X, these are both products of the information era. The lack of experience in the past had left this unpredictable technology problem in the development process. With such a background, we need to conduct further analysis of the core technology of the big data platform and related applications, and the corresponding improvement approach needs to be put forward.

Keywords: New Energy Vehicles, V2X Big Data, Technical Means, Current Situation Analysis, Strategies

Introduction
In recent years, China's new energy vehicles have been developing rapidly, which has solved the problem of traffic pollution to a certain extent. As a system to monitor the real-time status of new energy vehicles, the V2X big data platform will play a great role in promoting new energy vehicles and further promote the development of China's economy.

1. Big Data Platform for New Energy Vehicle and V2X
V2X big data platform obtains the specific data by placing sensors on new energy vehicles and uploads it to the cloud platform in time. The data will be examined by analysts who will provide basic evaluations about the operation of the vehicle [1]. In turn, it can take targeted solutions to the problems that occur in the vehicle and avoid casualties, so as to ensure personal safety. Besides, data analysts can address the possible problems of the vehicle based on the corresponding data, and then make risk evaluation to nip the possible problems in the bud, avoiding the emergence of safety problems and making the use of new energy vehicles reliable. It also improves the after-sales service quality and ensures the provision of user experience.

2. Relevant Background
The development of connected cars is expected to be a long journey. Either the quality of the car or the sustainability of the network technology will affect the development.

Our country has made considerable progress in new energy vehicles, with four main manifestations: First, the scale of Chinese vehicles is the first in the world. Second, the scale of Chinese power battery is the first in the world. Third, the Chinese rechargeable battery is the most complete in the world. Fourth, we have taken the lead in establishing a three-level new energy vehicle big data regulatory system for the central government, local governments, and enterprises, which makes China the pioneer of the world [2]. The integration of new energy vehicles and big data appears to be complementary through V2X. The amount of data examinations for vehicles is tremendous, which are generated into two parts: internal and external data. The external data mainly contains customer consumption habits, relevant environment, geographical location, etc. Internal data includes the data of the car itself, the design and development, factory sales, and other aspects. It is also necessary to adhere to green and sustainable development and ensure the sustainability of the environment [3].

3. The Significance
The charm of big data is reflected in the depth of its excavation and the breadth of the application. The integration and application of new energy vehicles and big data have become a major trend, and now the big data of new energy vehicles have entered the stage of cross-border industrial digital integration from the stage of the rapid outbreak of single-point data [4].

3.1. Perspectives of Enterprise
1) Safety Monitoring and Early Warning
The safety of electric vehicles has always been the focus of people's attention, which recently has been monitored by big data for early warning of faults. For example, battery fire, the biggest safety hazard of electric vehicles, is caused by nothing but over-voltage, over-temperature, and other numerical discrepancies of key indicators, which can be monitored accurately by big data [5]. Before the car reaches the situation that may cause a fire, the fire alarm will automatically go off, which can effectively reduce the loss caused by accidents.

2) Characteristics Analysis of Vehicle Users and Guide the Development
Through big data, we can obtain the characteristics of habits of vehicle users, and then optimize the vehicle based on the characteristics. For example, we can count the common fast-charging SOC intervals of users and improve the battery charging rate and reduce the charging time for the common intervals. We can count the common torque-speed intervals of motors to optimize motor efficiency and improve the range of electric vehicles [6]. We can also collect statistics of the boundary conditions of key components to match the parameters of the system development process, etc.

3) Intelligent Application Development
Big data can count the usage of each user, and then develop intelligent functions based on the characteristics of each individual. For example, the problem of inaccurate display of endurance mileage. We all know that even with the same car, different people, different routes, or different weather, range will lead to different endurance mileage [7]. The problem can be solved by tracking historical data to build the user's historical energy consumption model, and accurately calculate the range according to the characteristics.

3.2. Perspectives of the State
1) Vehicle Quality Monitoring and Evaluation
The quality of electric vehicles has been an issue of great concern to consumers. The state can provide effective guidance to customers by assessing the quality of each vehicle through the statistics and making evaluations on each production company and their products.

2) Analysis and Evaluation of Used Cars
3) Guidance of Charging Pile Layout
In recent years, both enterprises and the state are vigorously laying out charging piles. The questions like where to build charging piles or what is the appropriate number to build can be laid out by statistics of user charging habits.

4) Traffic Flow Planning
Traffic congestion has always been a big problem in Chinese cities, which shall be solved through big data that control traffic lights.

4. The Use of Key Technologies of Big Data Platform for V2X
As a system for detecting new energy vehicles, the big data platform for V2X has an important role in the development of new energy vehicles [9]. The system contains many parts, and the technology is relatively mature compared to the past. But there are still shortcomings that need to be improved in the future.

4.1. System Interface
The big data platform for V2X contains many parts that consist of different program codes. The data systems are different, so the problem of garbled codes can easily arise when the information is exchanged, which often makes the problem more complicated [3]. To solve this problem, it is necessary to establish a scientific platform to facilitate the exchange and the use of each vehicle system. It is important to recognize the problems in the process to ensure efficient data transmission as well as to avoid possible errors in data transmission, to the extent that related problems continue to arise and cause huge security problems [10]. And because the systems are carried out by networks, whose issue of stability is likely to bring further problems, especially in the practical application, when the network loses stability, it will lead to problems with the information transmitted. To solve these problems, it is necessary to use independent transmission equipment and means of information exchange to avoid the failures associated with network problems and ensure that supervisors can keep abreast of the operation of the car and find and solve problems promptly [11].

4.2. Analysis of the Data
With the widespread use of new energy vehicles, the carrying capacity of the big data platform for V2X will be increased and the sensor data will be increased accordingly, leading to an increase in the workload of data analysis [12]. The increasing amount of data transmitted back will not only trigger the problem of difficulties in analyzing the data, but also rapidly fill up the storage location of the platform, causing the problem of database paralysis. It requires researchers to consider the impact of a variety of problems when carrying out the construction of the big data platform of V2X, to improve the data reserve capacity of the platform as much as possible, to further use modern electronic technology means to conduct a comprehensive analysis of the data transmitted back, and to manage the system scientifically, so that the platform can analyze the data more efficiently and more accurately.

4.3. Integration of the Data
Many companies have new energy vehicles, each with its own data system, but these databases are scattered and not strongly correlated, which leads to the data of each company can only play a role in this company. While the group of data of a company cannot be used for other companies, it is helpless to the technology development of the industry [13]. Therefore, the companies should strengthen communications, sharing data resources and analysis, discussion and research on the emergence of
problems, set the efforts of personnel resources to collectively deal with difficult problems, and come up with appropriate solutions to provide valuable experience for the subsequent development of new energy vehicles and the establishment of a big data platform for V2X. Relevant departments should introduce corresponding rules and regulations to encourage more talents to join the construction of the technology and contribute to the development of new energy vehicles in China.

5. Conclusion
New energy vehicles, an emerging technology, can further improve the development of China's economy. There are still many problems with this technology, which requires the cooperation of additional information. And the big data platform for V2X, as a relatively complete monitoring system, can grasp the dynamics of new energy vehicles in real-time, so that problems can be found and solved in a timely manner. But at present, while the technology needs to be enhanced, it requires the relevant technical personnel to constantly improve and solve the corresponding problems to make technology more scientific and help develop the new energy vehicles and big data platform for V2X, which will bring China's new energy vehicle industry to a high-speed and healthy development.

Reference
[1] Fengchun Sun, “Key Technology and Application of Big Data Platform for New Energy Vehicle and V2X” Intelligent Networked Vehicles Vol. 01, 2019, pp74-75.
[2] Yalei Ma, “Introduction to the Application of Big Data in the Field of New Energy Vehicles”, Computer Products and Distribution, Vol. 011, 2019, p145.
[3] Haixia Zhang, Diandian Li, and Dongyang Li, “Research of IKey Technology and Smart Vehicle Networking Based on Vehicle Behavior Analysis”, Journal of Electronics and Information, Vol.41(01), 2020.
[4] Zhaoqian Wang, “An Introduction to the Application of Big Data in Intelligent Networked Vehicles”, Digital World, Vol. 006, 2017, p88.
[5] Ma, Yalei. Rep. Introduction to the Application of Big Data in the Field of New Energy Vehicles, Vol. 011. Computer Products and Distribution, 2019.
[6] Sun, Fengchun. Rep. Key Technology and Application of Big Data Platform for New Energy Vehicle and V2X. Vol. 01. Smart Networked Vehicles, 2019.
[7] Wang, Zhaoqian. Publication. An Introduction to the Application of Big Data in Intelligent Networked Vehicles. Vol. 006. Digital World, 2017.
[8] Zhang, Haixia, Diandian Li, and Dongyang Li. Publication. Research of IKey Technology and Smart Vehicle Networking Based on Vehicle Behavior Analysis. Journal of Electronics and Information, 2020.
[9] Zhang Xiping, Zhao Wei, Wang Lijie. Design and Implementation of Internet of Things Data Access Architecture for New Energy Big Data Platform.Vol.05, Distributed Energy. 2020.
[10] Zhang Tianqiang, Song Fang. Application and Practice of New Energy Vehicle Safety Technology, Automotive Digest, 2020 (02).
[11] Xu Shenbin, Duan Bowen, Zhang Qiang, Ma Cheng, Yi Tao. Design of New Energy Consumption Capacity Calculation and Regulation System, Vol.17, Wireless Internet Technology, 2020(01).
[12] Liu Zhao. Research on the technical architecture of the integration of energy systems and information technology under the background of energy and digital revolution, Electrical Engineering
[13] Zhao Shaodong. Wang Chengsi. Research and application of comprehensive energy big data platform based on heterogeneous computing and real-time visualization technology, Vol.35, Microcomputer Applications, 2020(11)