APPLICATION OF AI IN THE DEVELOPMENT OF NEW ENERGY VEHICLES

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ABSTRACT

The production and lifestyle of human beings in the AI era will have profound changes. The development of new energy vehicles is affected by technical bottlenecks and policy adjustments, but its intellectualization is the general trend. This paper mainly analyzes the advantages of AI combined with new energy vehicles in three aspects. The first is to improve the comprehensive performance, to integrate, and give comprehensive benefits. The second is to improve the adaptation in the environment, to keep safety, to stress response speed and environments. The third is to promote market-oriented development, to support AI, to realize technological innovation in the convenience of people's daily life and the social operation efficiency. The development process of AI in the case of driverless technology in China started later than in Europe and America, with thin technology accumulation, less research, and insufficient talents. Artificial intelligence can be divided into special AI, general AI, and super AI. The new energy vehicles are mainly reflected in the aspect of an unmanned driving system composed of sensors, onboard computers and mainly involves external environment identification, path planning, and trajectory tracking control. The first vehicle ATB-1 in China was developed. The second generation of ATB-2 has been successful, added remote control and night detection functions. The rapid development of domestic automobile enterprises is also increasing with an electric driving functional concept car. Precise in motion positioning without manual intervention and route planning. The intelligent development of energy utilization and driving range can mainly solve practical problems. A new round of industrial upgrading and reform will become the new normal of the development of the automobile industry among the mainstream trend. The development process of unmanned driving technology of intelligent vehicles from no automation to full automation with the new energy roadmap. It is believed that new energy vehicles will play a vigorous vitality with the progress of AI technology in the future.

Keywords: AI; New energy vehicle; Unmanned driving

I. INTRODUCTION

What many drivers don’t realise is that automation has almost always been a part of their experience behind the wheel. The first power windows were introduced way back in 1940. The earliest version of cruise control was patented in 1950. You could even purchase a car with hands-free phone capabilities back in 1988. These features are now so common in consumer vehicles that we forget the subtle role automation has already been playing in making our everyday car experience possible. There are even six levels of vehicle autonomy that outline the progress and what’s on the horizon for the vehicles of the future.(The promise of AI drives anticipation for the cars of the future, 2020)
Since the word of AI (Artificial Intelligence) was born in Dartmouth conference in 1956, AI has been widely used in many fields with the development of economy and society and the progress of science and technology, such as unmanned driving, smart home, voice interaction, visual recognition, intelligent warehouse and so on, which provides unlimited possibilities for people's life. As John Markov, the “Silicon Valley exclusive king”, said: "AI is like a new hammer, every field can be tapped like a nail." New energy vehicles are no exception, especially the unmanned driving technology of new energy vehicles. According to the data of China CITIC Bureau, the total number of all kinds of vehicles in China will reach 300 million by 2020, which will lead to more and more road traffic congestion, more accidents and environmental pollution. Vigorously developing new energy intelligent vehicles is a realistic choice for these problems, which not only can alleviate energy and environmental problems, but also reduce traffic safety problems. It can be said that it points out the future development trend of intelligent transportation. The application of AI in the field of new energy vehicles helps to give full play to the advantages of new energy vehicles and promote the construction of an environment-friendly and resource-saving society in China, which has important scientific value and practical significance. As Wikipedia showed that there were 4.9 million new energy vehicles at the end of 2020, accounting for 1.75% of all vehicles in Chinese roads, of which, 4 million are all-electric vehicles (81.3%). China accounts for 60% of the world's electric vehicle charging stations as well. (Wikipedia, 2021)

In the same direction as this study a result of emerging autonomous vehicle (AV) technologies. AV technologies can decrease the transportation cost and increase accessibility to low-income households and persons with mobility issues. In AV technology with respect to routing behaviors. Connected-vehicle technology provides a great opportunity to implement an efficient and intelligent routing system. To this end, we propose a conceptual navigation model based on a fleet of AVs that are centrally dispatched over a network seeking system optimization. This study contributes to the literature on two fronts: (i) it attempts to shed light on future opportunities as well as possible hurdles associated with AV technology; and (ii) it conceptualizes a navigation model for the AV which leads to highly efficient traffic circulations. (Bagloee S.A., Tavana M., Asadi M. and Oliver T., 2016)

**Advantage analysis of AI application in new energy vehicles**

New energy vehicles have achieved rapid development with the advent of the era of subsidies for it in 2009, China's financial subsidies from the pilot to the whole country, the scope of promotion from the public sector to the private sector, and the technical requirements from focusing on fuel saving capacity to driving range, which becoming more and more scientific and reasonable. However, the notice on further improving the financial subsidy policy for the promotion and application of new energy vehicles jointly issued in 2019 by the Ministry of finance, the Ministry of industry and information technology, the Ministry of science and technology and the development and reform Commission, which proposes that the subsidies for new energy vehicles will be fully withdrawn by 2020. On the one hand, it can promote the smooth transition of the new energy vehicle industry, on the other hand, it is conducive to create a fair market environment. However, China's automobile production and sales continued to rank first in the world according to the statistical data of China Automobile Industry Association in 2019, but the production and sales of new energy vehicles completed 1242000 and 1206000, respectively, down 2.3% and 4.0% year-on-year, indicating that the market situation of new energy vehicles is not optimistic, and technological innovation is urgently needed to support the development of new energy vehicles. At the same time, new energy vehicles are also faced with practical problems such as unbalanced market development, imperfect supporting infrastructure, and difficult breakthrough of power battery technology. Therefore, the intelligent development of new energy vehicles is imperative. AI has the characteristics of large memory space, fast computing speed, high behavior accuracy, big data driven knowledge learning and so on. The main advantages of AI combined with new energy vehicles are reflected in three aspects.
The first is to improve the comprehensive performance of new energy vehicles. The integration of AI and new energy vehicles not only can give full play to the comprehensive benefits of AI and new energy, but also promote the energy-saving and environmental protection, driving experience and technological breakthrough of new energy vehicles, which also beneficial to the development of unmanned driving technology of new energy vehicles and promote the overall intelligent level of new energy vehicles.

The second is to improve the adaptation of new energy vehicles in the environment. The driving safety of new energy vehicles can be enhanced through the application and innovation of AI in new energy vehicles, the stress response speed can be improved, and the applicability of new energy vehicles to different road conditions, weather and other environments can be continuously improved.

The third is to promote the market-oriented development of new energy vehicles. With the support of AI, new energy vehicles can continuously break through their own development barriers, realize technological innovation in the convenience of people's daily life, withstand the market test and be widely recognized and used, and improve the social operation efficiency.

**Application scenarios of AI in the development of new energy vehicles**

In the development of new energy vehicles, AI, especially driverless technology has been explored and applied more or less, which is closely related to the intelligent development process of new energy vehicles. Compared with the developed countries in Europe and America, the intelligent development of new energy vehicles in China started late, the technology accumulation is relatively thin, the investment in scientific research is less, and the talents are relatively insufficient, but the development speed is fast and the market prospect is broad. Artificial intelligence (AI) can be divided into special AI, general AI and super AI, driverless prefer special AI in the field of transportation, it may also cover general AI in the future, adding more AI functions to the automobile.(Huakun, T.2018).

It can be said that the application of AI in new energy vehicles is mainly reflected in the aspect of unmanned driving for a period of time, the research on unmanned driving in China started from the military field, and has broad prospects in the civil field. The unmanned vehicles is a kind of vehicle system composed of sensors, on-board computers and vehicles, which can complete the automatic driving function, which has the advantages of rapid response, accurate perception, and elimination of fatigue. (Weisong, D.2018)

Unmanned driving technology mainly involves vehicle external environment identification, vehicle path planning, vehicle trajectory tracking control and other issues.(Yu Zhiheng.,2018) As early as 1980, the military anti nuclear and chemical reconnaissance vehicle was jointly developed by the University of Defense Science and technology, Harbin Institute of technology and Shenyang Institute of automation. Subsequently, the first unmanned vehicle ATB-1 (Autonomous Test Bed-1) in China was developed, which can realize autonomous driving, road tracking and obstacle avoidance, the straight speed can reach 21 km / h. The second generation of ATB-2 has been successfully developed, which has added remote control and night detection functions, and its speed can reach 74 km / h on structured roads. (Niu. L,2016) With the rapid development of domestic automobile enterprises, the exploration of unmanned driving field is also increasing. During the 2013 Guangzhou auto show, GAC group launched a WITSTAR concept car independently developed by GAC Research Institute, which is a pure electric driving functional concept car based on B-class car platform, It is equipped with an autonomous driving controller, which can make driving decisions according to the known navigation route planning, environmental information and vehicle status, and simulate the driver's implementation of the vehicle's advance and retreat, steering, steering Acceleration and deceleration, braking and parking operations.(GAC.,2014)
The application scenarios of AI in the unmanned driving of new energy vehicles are mainly reflected in the dynamic environment perception driven by big data including vehicle safety inspection, object detection, information collection and feedback. Precise motion positioning without manual intervention including route planning and adjustment, distance control of safe driving, balance of running speed, etc. Intelligent prevention and control in the face of uncertainty, including risk identification and evaluation, decision analysis, early warning and reflection, automatic prevention and control operation, etc.

**AI application prospect in the development of new energy vehicles**

AI has a broad application prospect in new energy vehicles, but it also needs to break through the corresponding technical bottlenecks, which can realize the intelligent development of new energy vehicles in the process of constantly solving practical problems. In the short term, it can be said that unmanned driving is the concentrated embodiment of AI application in the field of new energy vehicles, and the intelligent development of new energy vehicles will mainly achieve a gradual breakthrough in unmanned driving, and solve the practical problems of energy utilization, driving range, unmanned driving and operation safety in new energy vehicles. In the long run, the integration and development of AI technology and new energy vehicles will not only bring a qualitative leap for new energy vehicles, but also provide intelligent solutions to "big city disease" in terms of energy saving and emission reduction, urban traffic efficiency and safe travel, so as to facilitate people's travel and improve social operation efficiency. AI has also made great progress in the development of new energy vehicles in China. The world's first unmanned driving electric truck was put into trial operation in Tianjin port in 2018, which can be called L4 class unmanned electric truck under the condition of no intervention, can completed the specified actions such as road driving, precise parking, container loading and unloading, obstacle response, etc, and realized the full automatic driving horizontal transportation of containers from shore to storage yard. (Chao Z., and Luna. W. (2018)

As the first L4 level unmanned microcirculation electric bus without steering wheel, accelerator and pedal in China, Apollo represents the latest achievement of China's unmanned driving technology, with three capabilities of high-precision positioning, intelligent perception and intelligent control, which is full of "high-precision" sensor devices to capture the surrounding external information, and a variety of sensors work together. (Red Star Award Organizing Committee.,2019). It can be said that new energy vehicles need more intelligent to support the development of power with the economic development and technological innovation, and intelligent is also the future development direction of new energy vehicles. A new round of industrial upgrading and reform represented by digitization, intellectualization and green driving and riding will become the new normal of the development of the automobile industry, among which automatic driving is undoubtedly the mainstream trend. However, it is difficult to realize unmanned driving in the current situation due to the influence of a series of objective conditions such as laws and regulations, road conditions, driving habits and other objective conditions [9]. The development of unmanned driving technology of intelligent vehicles from no automation to full automation is a process, which has the core technology to be explored urgently including the effective coordination among the integrated monitoring system, signal system (SIG) and vehicles. (Fang Yijun.,2009).

According to the planning steps of "energy saving and new energy vehicle technology roadmap" issued by the national manufacturing Power Strategy Advisory Committee under the Commission of the Ministry of industry and information technology, in the near future, unmanned driving mainly focuses on autonomous environmental awareness, and promotes the application of partial automatic driving (PA level) supplemented by network service information; in the medium term, it focuses on the formation of network connected environmental awareness ability, which can achieve half of the total under complex working conditions Automatic driving (CA level); long term promotion of intelligent technology with V2X collaborative control and high / complete automatic driving
function. It is believed that new energy vehicles will play a vigorous vitality with the progress of AI technology in the future.

II. CONCLUSION

The automobile industry is the comprehensive embodiment of the national industrial level, and the development of unmanned driving new energy vehicles in the AI era can be said to be an important symbol of national scientific and technological strength. Although the new energy vehicles are facing technical bottlenecks such as power battery, driving safety and driving range, and also affected by policy adjustment, the intelligent development of new energy vehicles with the progress of AI technology and the application, especially the unmanned driving new energy vehicles, will approach people's daily life and enter into thousands of households, which reflect its value in constantly meeting the people's infinite yearning for a better life.

All parties involved should consider

1. The government still lacks a clear policy and direction to promote and support autonomous vehicle technology. Robotics and automation

2. Unmanned aerial vehicle (UAV) has made great progress. It is also widely used. Which may have been used in terrorism. Affect the security side, therefore The government sector and all related sectors must work together to find preventive measures. And layout measures to control and supervise to ensure safety

3. Improving laws and legislation to promote and control the use of driverless technology. Robotics and automation must be accelerated because they have both positive and negative impacts.

4. The government still lacks promotion and encourages the procurement of unmanned vehicle products. Robots and automation made by Thai people Including the lack of establishing a calibration standard or a quality system that is accepted by domestic and foreign users.

5. The government lacks long-term planning on what level, what level, and how much manpower needs, and analyzes the mechanisms of future manpower development. At all levels to include technology research and development groups, both public and private sectors Including the creation of new generation entrepreneurs

REFERENCE