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Modeling of the Adoption of Electric Vehicles Mathematically

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Abstract

Numerous nations have prioritized electrifying their transportation sector to decarbonize it in support of the transition to net zero because decarbonisation is becoming increasingly significant. As a result, research on the use of electric vehicles has grown dramatically in recent years. The process of optimizing the transition to electric vehicles relies heavily on mathematical modeling. The adoption of electric vehicles is mathematically modeled in this systematic literature review that is described in this article. In order to answer six research questions regarding the process of modeling transitions to electric vehicles, 53 articles containing mathematical models of electric vehicle adoption are systematically reviewed in this study. The main obstacles to the adoption of electric vehicles, as well as the mathematical modeling techniques observed in the existing literature, are discussed, and suggestions for future research directions are made.

Keywords: Modeling transitions • Mathematical modeling techniques • Mathematical literature

Introduction

Decarbonization the reduction of carbon emissions is becoming an increasingly significant objective in light of the established scientific link between the amount of carbon in our atmosphere and global warming. The Paris Agreement, an international treaty on climate change negotiated by the United Nations, is just one example of a number of developed nations that have made formal commitments to achieving decarbonization within a specific timeframe in recent years. The Industrial Decarbonisation Strategy, which outlines how the industry can decarbonize in accordance with net zero, highlights its significance in the UK. the equilibrium between the amount of greenhouse gases released into the atmosphere and the amount released into it. Bhutan and Suriname are the two nations that have achieved carbon neutrality, and many other nations around the world have a decarbonization strategy. Uruguay has committed to carbon neutrality by 2030, closely followed by Finland in 2035 [1,2].

Discussion

According to the Department for Business, Energy, and Industrial Strategy (Department for Business, Energy, and Industrial Strategy, 2020), in 2019, the transport sector was estimated to be responsible for 34% of the UK's total carbon dioxide emissions. Public transportation, a more shared mode of transportation, is being advocated for by a lot of scientists. However, "car use is characterised and deeply rooted in an individual's feelings of autonomy and freedom of movement," As a result, in order for any transition to be supported by the population, it must preserve this freedom of movement and autonomy. This might not be accomplished by moving entirely to public transportation and eliminating private automobiles. Therefore, in order to avert the total elimination of private vehicles, it is necessary to make the switch from conventional vehicles that run on fossil fuels to alternative fuel vehicles, specifically electric vehicles (EVs). This is demonstrated by the UK government placing EVs at the center of its industrial strategy. The Road to Zero, which is the transition to zero-emission road transportation, sets the stage for achieving this goal, and the sale of gasoline and diesel vehicles will be prohibited beginning in 2030 in accordance with the Ten Point Plan for a Green Industrial Revolution. The study of EV adoption is important for a number of reasons despite the fact that many nations are requiring the electrification of their transportation systems. There will likely be a market for used internal combustion engine vehicles (ICEVs) following the ban on new vehicle sales. If there aren't enough incentives to buy an electric vehicle, many people may choose to buy a used ICEV for a long time after the ban. The timely switch to EVs would then be postponed as a result of this. The second-hand ICEV market will not impede the transition to EVs because of the study of EV adoption prior to the elimination of new ICEVs, which can guarantee high consumer support for this transition [3].

A technological shift is taking place during the EV transition. To put it another way, it is a significant technological shift in the way the societal transportation process is carried out. It also involves changes that aren't just technological, like "changes in user practices, regulation, industrial networks, infrastructure, and symbolic meaning." As a result, completing this transition in a timely and effective manner is a difficult problem. The difficulty of the transition is caused by a number of factors. For instance, the infrastructure and maintenance networks of the current UK transportation system make ICEVs, which are vehicles powered by fossil fuels, possible. Owners of electric vehicles may be concerned about maintenance accessibility as a result. Additionally, there are concerns regarding the vehicle's residual value and the rate of technological advancement among EVs. Additionally, individuals' behaviors must change as a result of technological shifts, which necessitate user practices shifts.

Conclusion

Potential EV users frequently suffer from range anxiety, which is a significant obstacle to the adoption of electric vehicles. Particularly, the inability of the vehicle to reach its destination is associated with range anxiety. When battery electric vehicles (BEVs) are used to travel long distances that may exceed the vehicle's driving range, this problem is especially prevalent. In order to alleviate range anxiety, more charging infrastructure is required. However, EV users must also become familiar with the concept that frequent charging is a part of mobility, which may be unfamiliar to many. Because charging an EV takes longer than filling an ICEV with fuel, they may need to factor in the time it takes to charge their vehicle into their daily schedule in certain circumstances, such as when traveling a long distance. To put it another way, the transition to electric vehicles (EVs) may also be regarded as a socio-technical transition because technology and societal processes are intrinsically linked [4,5].

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Conflict of Interest

None.

References

1. Owe, Manfred, Richard de Jeu and Jeffrey Walker. "A methodology for surface soil moisture and vegetation optical depth retrieval using the microwave polarization difference index." *IEEE Trans Geosci Remote Sens* 39 (2001): 1643-1654.
2. Njoku, Eni G., Thomas J. Jackson, Venkat Lakshmi and Tsz K. Chan, et al. "Soil moisture retrieval from AMSR-E." *IEEE trans Geosci remote sens* 41 (2003): 215-229.
3. Grob, Martin, Marc E. Pfetsch, Lars Schewe and Martin Schmidt et al. "Algorithmic results for potential-based flows: Easy and hard cases." *Networks* 73 (2019):306-324.
4. Boege, Tobias. "Gaussoids are two-antecedental approximations of Gaussian conditional independence structures." *Ann Mathe Artif Intell* 90 (2022):645-673.
5. Possieri, Corrado and Andrew R. Teel. "Structural properties of a class of linear hybrid systems and output feedback stabilization." *IEEE Trans Automat Contr* 62 (2016):2704-2719.

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