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Onboard System to Improve Energy Efficient Driving of Electric Cars: An Experimented Study

Bachelorarbeit

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1. Introduction

The climate change and the use of renewable energy is a topic that can be found quite often in the news. Germany will stop using atom energy and even the USA is trying to improve the percentage of renewable energies in their country. Form 30th of November till 11th of December the Nations Framework Convention on Climate Change, 21th Conference of the Parties will be in Paris trying to find an agreement that can follow the Kyoto protocol. Furthermore the danger of global warming is an omnipresent topic, too. Besides is know that we will run out of oil one day. Experts are discussing when it will happen exactly, but it is clear that it will happen one day. Thus an alternative way of powering cars is needed. First approaches were using liquefied petroleum gas to power cars. However gas is exhaustible, too. Another idea was to use biodiesel but it became never that accepted and has some other problems like bosting corn prices since all the corn is used to produce biofuel instead of making food out of it. The next step was going away for combustion engine to electric engine. Using renewable sources electric energy is endless. Hence electric powered cars might be the future of means of transportation. However nowadays there are some limitation and obstacles going along with electric car. First of all they are still quite expensive and it took a long amount of time to compensate the high capital expenditure of the beginning with the saving through cheaper refilling costs. A further problem of electric cars is the short driving range. For example the VW e-Up has a range about 120km if the battery is fully loaded. Driving aggressive or with a high speed will reduce this range even more.

Thus information systems are developed trying to help drivers to get to know how to drive more energy efficient. Energy efficient driving lead so a lower energy consumption per 100km. Thus electric cars get a higher range and the battery is prevented from damage as less charges are needed to travel the same amount of length. Additionally energy saving, not only with cars, helps to save the environment if not only renewable energy is used.

This paper tries to identify whether an onboard information system can help to reduce the energy consumption. Therefore a field experiment is developed to investigate the influence of such a system. Finally the data form the experiment are evaluated.

6. Conclusion and Outlook

Nowadays reducing the energy consumption of an electric vehicle is a relevant topic. The battery capacity is not good enough yet to drive long way with electric cars. Thus reducing energy consumption with the help of information systems is important to enhance the range and make them more attractive for buyers. Furthermore an energy saving way of driving helps the environment and to save money. However these application have to be easy to use and must have a measurable effect or people would not be interested in using them. The main focus of the paper was to investigate the impact of an onboard system to improve energy efficient driving of electric cars with a field experiment. To measure an effect there were two groups, one using the Think Blue Trainer while driving the other not. There was no significant difference of the energy consumption of both group. However the experimental group has a significant higer Think Blue Score. Furthermore a significant negative correlation of the Think Blue Score and the energy consumption was proofed. Supplementary a significant positive correlation of driving time and energy consumption was verified. Finally a multiple regression model was developed to describe the relation of driving time, Think Blue Score and energy consumption. The results can be used to enhance application which are used to reduce the energy consumption. Electric cars might be means of transportation of the future and thus it is important to reduce the energy consumed by them to save the environment and make a better world.