

The use of Throttle Control in Electric Vehicle

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Abstract

In the recent past, the usage of electric vehicles has been on the rise. However, electric vehicles have features that make them more accident-prone; there are high currents in the powertrain of electric vehicles coupled with the lack of clutch, which disengages the power to the drive shaft. Consequently, electric vehicles can easily involve accidents causing injuries or loss of life and property. To solve this problem, the Throttle Control of Electric system has been designed with the aim of promoting safety among electric cars so as to reduce the incidents of accidents owing to its features. This technology is likely to increase the usage of electric cars, particularly due to the improved safety standards.

Introduction

The automobile industry is one of the industries that has experienced technological disruption in the past few decades. One such technological disruption is the innovation of Throttle control of an electric vehicle; a technology that is used in the electric vehicle. Throttle control of an electric vehicle – also referred to as electronic throttle control, is a technology in the automobile industry that refers to a technique in which the accelerator pedal is electrically connected to the throttle [1]. Employing this technique means that the mechanical linkage is replaced by the electrical linkage. The ETC consists majorly of three major components, which include a throttle valve pedal module (this may have two or several independent sensors), a throttle valve that is able to open and close with the help of an electric motor (also referred to as electronic throttle body (ETB), and engine controller module (ECM) also known as the powertrain controlled module (PCM) [2].

The ECM or PMC forms part of an electronic control unit (ECU) that is an engraved system that makes use of software to ascertain the needed throttle position by calculations from a set of data that are measured by other sensors [3]. These sensors include the vehicle speed sensor, the accelerator pedal position sensors, cruise control switches, and the engine speed sensor [4]. The electric motor is then used to unseal open the throttle valve to an angle that is the desired angle via a closed-door control algorithm that is situated within the ECM [2]. The throttle valve is a part of the throttle body (it is also referred to as ETB) and its location is between the intake manifold and the air cleaner. On any vehicle that is equipped with the throttle controller sensor (TCS), the throttle opening is considered based on the duration of the magnitude of how far the gas pedal was pressed.

Two types of throttle position sensors (TPS) have been developed. One is a non-contact sensor which is known as the potentiometer, and a magnetic device called the Hall Effect sensor. A potentiometer is not as reliable as a magnetic device because it can cause erratic readings. The erratic reading comes about as a result of dirt and tear/wear between the resistor and the wiper because it is made up of a wiper that rubs against a resistant element. It is, therefore, advisable to use magnetic coupling that has no physical contact; thus, the issue of failure as a result of rubbing does not arise [3].

Every car that is fitted with throttle position sensors has a limp-home-mode” The limp-homemode comes as a result of a situation when there is no communication between the accelerator and engine control computer and the throttle. This means that the engine control system has to shut down the signals that need to go to the throttle position motor then some springs in the throttle turn it to fast idle.

This technique is beneficial in the motor industry because of the advantages that it brings to the industry, such as efficiency and reliability. With this technology, consumers will be able to develop trust in electric cars which will further boost its users worldwide. It is needless to say, the electric car in itself has numerous benefits, and when coupled with the Throttle Control of the Electric system, the innovation will go along way as far as motor vehicle manufacturing is concerned [1]. This system will disrupt the motor industry in gigantic proportions.

Conclusion

One of the major achievements of revolutionary science is the green technology. The green technology has become a significant aspect of the current human lifestyle. As a result, a growing number of motor vehicle manufacturers have in the recent past been forced to change their strategies towards the production of a higher number of electric cars. This is based on the fact that safety is a primary objective for all vehicle manufacturers. However, safety is much more emphasized in the electric cars than those of the IC engine cars. The reason why safety is overemphasized in electric vehicles is that of the high currents in the powertrain of electric vehicles coupled with the lack of clutch, which disengages the power to the drive shaft. This calls for the need for an extra safety circuit for electric cars. It has been identified that the main causes of dangers are the floor mat and pilot error induced by the design.

The above-listed hazards have taken place as a result of a design flaw and driver error. These accidents may have serious consequences, for example, vehicle toppling, among others. These accidents are contributed by the independence of the drive train and braking that operate parallel to each other. To solve this problem, an Automotive safety system referred to as the Throttle Override Safety system is developed. This system takes care of the safety hazards brought by the pedal related issues. This is particularly developed for the purposes of keeping the electric car and its safety issues in mind, thus best fit for the electric cars in relation to the combustion engine cars.

Due to the rising use of electric vehicles among consumers, their safety is also increasingly becoming mandatory. Therefore, the application of safety circuits has become critical in enhancing the adoption of electric cars. While particular safety circuits have been employed, the degree of safety so far available is not sufficient enough to meet public demand regarding the safety standards. This is attributed to the fact that all the test cases are not considered possible in the circuits. The circuits that are proposed herein give better safety. Furthermore, the circuits have modest interfacing, thus, large-scale adoption and implementation is not a daunting task. Moreover, it does not require a vehicular system overhaul. Parameters such as size reduction or experimenting with modes may be done, but not experimenting with analog. Nevertheless, the fundamental principles and requirements are not changed. The overall aim is to have safety in vehicles of whichever type so as to minimize cases of accidents.

Work Cited

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