

Car Battery Management System

CROSS-REFERENCE TO RELATED APPLICATIONS

None. This application is a first application to Intellectual Property of Singapore for a Singapore Patent.

FIELD OF THE INVENTION

This invention relates to car management system that direct measure the fluctuation of the voltage of car battery during the cranking of engine to predict the health status of the car battery.

BACKGROUND OF THE INVENTION

Many car battery measuring and management system currently comprise of a device that is insert to either the cigarette socket or On Board Diagnostic (OBD) socket. These systems measure the voltage of the car battery indirectly, usually via another circuit route. These additional circuit routes induce a voltage drop due to resistance and reduce the accuracy of these voltage reading. Another limitation of these systems is that they provide end-users the current moment of voltage reading of the car battery. This parameter tells very little of the health status of the car battery. It does not provide any information of the charges hold by the car battery, nor the current flow of the battery.

In the invention, the car management system includes a device attaches directly across the two terminals of the car battery. This arrangement ensures the voltage measurement reflects the actual voltage of car battery. The reading is transmitted to an electronic device. These electronic devices may include but limited to, mobile phone, tablet or dashboard onboard the car. An application is developed and installed into the electronic devices. The application has the ability to analyze these reading and advise the end users the health status of the car battery.

SUMMARY OF INVENTION

According to an exemplary aspect, there is provided a car battery management system comprising: a device to be connected directly to a car management battery, and an application that communicate with the device. The application is able to analyze the reading received and advise the health status of the car battery. The device further comprise of an electronic integrated chip that read the voltage of the car battery in real time; and another electronic integrated chip that convert these reading into digital signal, and another electronic integrated chip that is able to transmit these digital signal wireless to the application installed in the electronic devices.

The device is a printed circuit board assembly (PCBA) housed inside a polymer casing for protection. Two wires, each with one end connected to the PCBA and the other end crimped with an open U shape connector. The open U shape connector facilitate the wire to be connected to the battery terminal clamp at its fastener. One wire is meant for the positive terminal and other for negative terminal.

The reading of the of the voltage of car battery are taken at a sample rate of at least 10 reading per seconds. These voltage reading signals are transferred to another electronic integrated chip, which in turn transmit these signal wireless to the electronic device by another electronic integrated chip.

An application was developed to receive these wireless signal. The application is based on data based algorithm. It has been known that the fluctuation of voltage level during the cranking of car engine can give a strong indication of the health status of a car battery. However, there had been little in depth studies on the relationship between these two factors. A series of crank data of voltage fluctuation of different car battery health were collected. Based on these data, a relationship between the car battery health status of car battery and the voltage level fluctuation during cranking was established. This new found relation formed the basis of the algorithm for the application ability to determine the health status of the car battery.

BRIEF DESCRIPTION OF FIGURES

In order that the invention may be fully understood and readily put into practical effect there shall now be described by way of non-limitative example only exemplary embodiments of the present invention, the description being with reference to the accompanying illustrative drawings.

- Figure 1 Fully assembled view of an embodiment of the device of car battery management system.
- Figure 2 Simplified schematic of the PCBA of the device of car battery management system.
- Figure 3 A representation of voltage fluctuation of the car battery during cranking of engine.

DETAILED DESCRIPTION

An exemplary embodiment of the safety warning device will be described with reference to Figure 1 to Figure 3 below.

As shown in Figure 1, the battery management system consist of an application and a physical device 100. The device 100 comprise of two wires each with open u clips 140. One wire for positive terminal 110 and the other for negative terminal 120. The open U clip 140 facilitate a secure attachment to the battery terminal clamps via its fasteners.

In figure 2, a simplified schematic 200 of the printed circuit board assembly (PCBA) 210 of the device 110 of car battery management system is shown. A convertor integrated chip 220 reads the voltage across the terminal at real time and convert the reading into digital signal. The reading is take at a sampling rate of at least 10 reading per seconds. These digital signals are transferred to another transmission integrated chip 230, which is able to communicate with electronic devices wirelessly. The protocol of the wireless communication may include but not limited to, IEEE 802.11x (WiFi), Bluetooth, and the various generation wireless technology for digital cellular networks such as 5G.

Figure 3, shows a representation of an example of the profile 300 of voltage fluctuation of the whole cycle of cranking of a car engine. A large number profiles of different battery health status of these fluctuation is collected to form a training data. The training data is fed to deep learning engine. As a result, relationships between the battery health status and the voltage fluctuation during cranking of car engine. These relationships form the basis for the artificial intelligent in the application to determine and advise the end use of the car battery health.

CLAIMS

The invention claims are:

1. A car battery management system of claim that use of an application to advise the car battery health status based on the data of voltage fluctuation during the cycle of cranking of car engine.
2. A car battery management system that acquire the data of voltage fluctuation during the cycle of cranking of car engine by use of a device connected to the car battery directly.
3. A car battery management system that acquire the data of voltage fluctuation during the cycle of cranking of car engine by use of a device connected to the car battery directly and transmit the data another electronic via wireless communication protocol.