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Microcontroller Based Swapping of Batteries for Electric Vehicles with Health Condiction Monitoring of Driver Using IoT

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ABSTRACT

Electric car sales have been constrained by issues including range, lengthy charging times, and power outages. The main issue with electric vehicles is that the battery, which provides the motor with power, loses charge, necessitating stopping or parking them in locations where it is simple to draw current. But the main issue is that you can't go to your palace if the automobile loses its full charge while you're driving through an area where the current cannot be drawn readily or where there is no current at all. Therefore, in order to solve this issue, we are employing a battery-swapping technique that will require two batteries. (Battery 1 and Battery2). Battery 2 power will be used after battery 1 starts to run low on power. This can be accomplished by employing a relay, which will show the condition of battery 1 and then switch the battery power from battery 1 to battery 2 automatically. Additionally, the battery 1 that has lost power can be recharged using the wheels' installed dynamo. Because a dynamo is a machine that can convert mechanical energy into electrical energy. According to the description of this technique, one dynamo is installed in each wheel, causing each dynamo to generate a charge as a result of the rotational motion provided by the vehicle's wheels. These charges are then stored in a battery that has been completely discharged and can be used in an emergency. A heart rate sensor that is incorporated into the driver's seat belt allows for the monitoring of the driver's health in this situation. The sensor alerts the micro-controller, who then notifies the individual in question if there are any anomalies in the driver's heart rate.

KEYWORDS: Wireless sensor network (wsn), internet of things (IOT), Battery, Electric charge

1. INTRODUCTION

A vehicle that is powered by one or more electric motors and uses electrical energy from batteries or another energy storage system is referred to as an electric vehicle. Until improvements in internal combustion engine technology and the mass production of less expensive petrol vehicles led to a reduction in the use of electric drive vehicles, electric cars were widely used in the late 19th and early 20th centuries. A brief interest in electric automobiles was sparked by the energy crises of the 1970s and 1980s, but in the middle of the 2000s, this interest was revived, mostly as a result of worries about fast rising oil prices and the need to cut greenhouse gas emissions. As of July 2012, series production highway-capable models available in some countries include the Tesla Roadster, REVAi, Buddy, Mitsubishi i MiEV, Nissan Leaf, Smart ED,Wheego Whip LiFe, Mia electric, BYD e6, Bolloré Bluecar, Renault Fluence Z.E., Ford Focus Electric, BMW ActiveE, Coda, Tesla Model S, and Honda Fit EV. As of June 2012, the world's top-selling highway-capable all-electric cars are the Nissan Leaf, with more than 30,000 units sold worldwide, and the Mitsubishi i-MiEV, with global deliveries of 20,000 vehicles, including units rebadged as Peugeot iOn and Citroën C-Zero for the European market. Electric cars have several benefits compared to conventional internal combustion engine automobiles, including a significant reduction of local air pollution, as they have no tailpipe, and therefore do not emit harmful tailpipe pollutants from the onboard source of power at the point of operation; reduced greenhouse gas emissions from the onboard source of power, depending on the fuel and technology used for electricity generation to charge the batteries; and less dependence on foreign oil, which for the United States and other developed or emerging countries is cause for concern about vulnerability to oil price volatility and supply disruption.

Vehicles are the demand for today's fast life but an increased number of vehicles have grown many serious issues on the environment and also on their management. Moreover, since they are driven by the power of non-renewable sources there is a need to develop better alternatives for future public transportation with an efficient vehicle management section. Dependency on fossil fuels makes them unsustainable as a major part of these have been exhausted and it will take thousands of years to generate them again and hence with them they also make the transportation unsustainable.

2. RELATED WORKS

[1]. At the epicentre of this research is the idea of revolutionising the entire automobile sector, which can be realised employing the concept of xEVs. The xEVs are indeed the need of the hour owing to above-mentioned reasons and many others too[2]. The development of the xEV technology must be

concomitant with the development of the charging technology for vehicles [3–9].The charging infrastructure constitutes the backbone of the xEVs [9]. The diverse genres of xEVs include plug-in electric vehicles (EVs), plug-in hybrid EVs etc. and are sensational in numerous prospects that include reliance from fossil fuels,monetary savings, emission-free, safe driving, reduction in noise,low maintenance etc. [10–18].

3. EXISTING SYSTEM

The existing system uses Genetic Algorithm Tuned Pontryagin's Minimum Principle Controller for Energy Management Strategy Implementation in Hybrid Electric Vehicles. online intelligent energy management controller is applied to a midsize electric vehicles(EV).

4. PROPOSED SYSTEM

The proposed system uses a in the electric vehicle is that the charge in the battery which gives the supply for motor gets discharge and hence it should be stopped or parked in the area where the current should be easily taken. But the biggest problem is that when the car get loses its full charge while driving in an area where the current could not be taken easily or there is no sort of current in that area then you can't able to reach your palace. Hence to change this problem we are using a battery swapping method which will use two batteries (Battery 1 and Battery2). When the power from battery 1 starts draining, the battery 2 power will be used. This can be done by using a rely which will indicate the status of battery 1 and then it will automatically swap the battery power from battery 1 to battery 2. Also the power drained battery 1 can be charged using the Dynamo which is fitted on the wheels. Since Dynamo is a device which is capable of changing mechanical energy into electrical energy. The description of this technique is that by placing one dynamo in each wheel, so that each dynamo will produce a charge through the rotatory motion given by the wheels of the vehicle and these charges is stored in a drained battery and that can be used for the emergency purpose and this process is cyclic. The driver's health can also be monitored here by using heart beat sensor which is placed in the driver's seat belt. If there is any abnormalities in the driver's heart rate, the sensor sends the signal to the micro-controller which will send the message to the concerned person.

BLOCK DIAGRAM

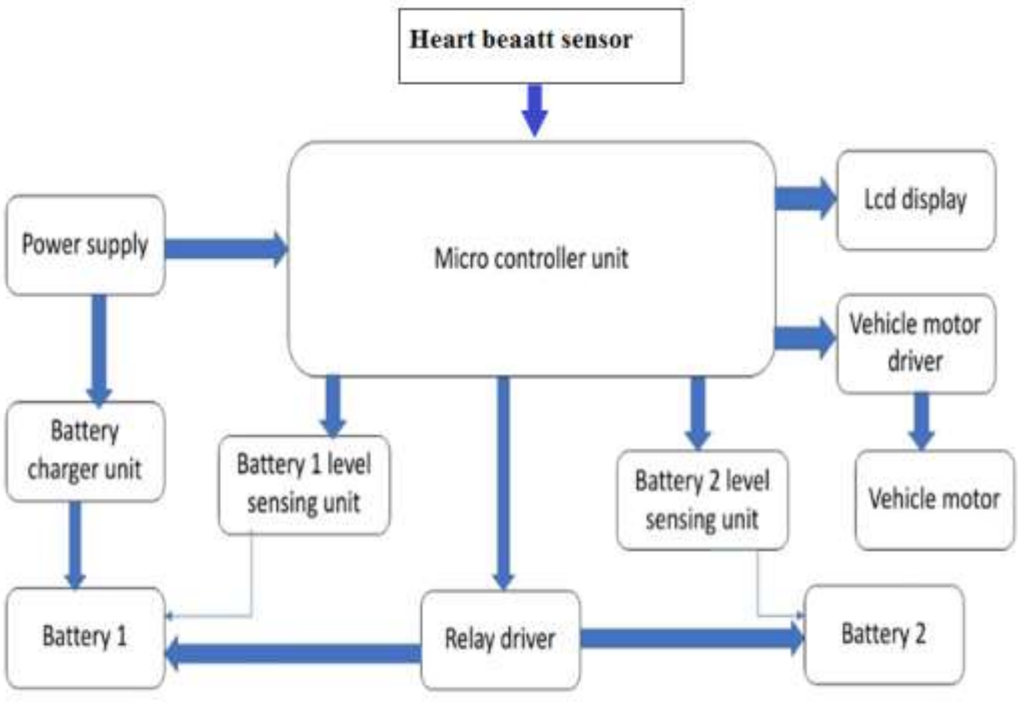

Fig:1 Block Diagram

WORKING OF THE SYSTEM

Dynamo is a device which is capable of changing mechanical energy into electrical energy .Hence by using this character of the dynamo the problem can be solved. The description of this technique is that by placing one dynamo in each wheel so that each dynamo will produce a charge through the rotatory motion given by the wheels of the EV car and these charges is stored in a separate swapping battery and that can be used for the emergency purpose and this process is cyclic. When car losses its charge while running on the charge produced by the dynamo, the dynamo will not stops its work, it again produce a charge so that you can go for a longer distance.

HARDWARE DESCRIPTION

4.1ATMel 328 MICROCONTROLLER

The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power savingmodes.

4.2 16x 2 LCD MODULES

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal The LCDs used exclusively in watches, calculators and measuring instruments are the simple seven-segment displays, having a limited amount of numeric data. The recent advances in technology have resulted in better legibility, more information displaying capability and a wider temperature range. These have resulted in the LCDs being extensively used in telecommunications and entertainment electronics.

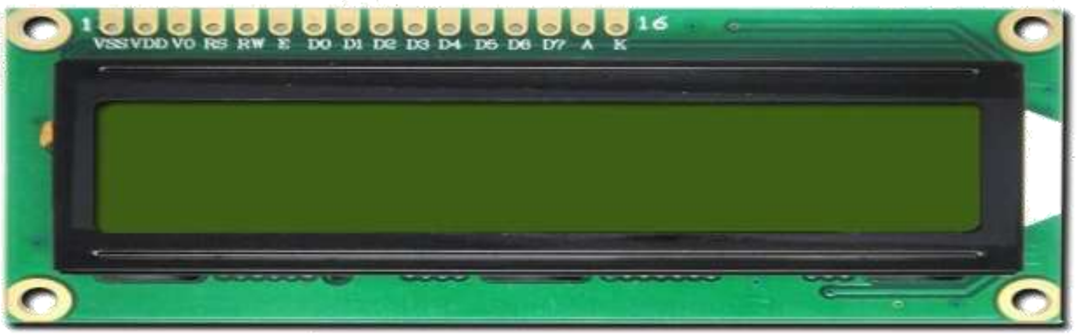

Figure: 4.2. 16x 2 Lcd Modules

4.3 Battery 12 V

A battery is a device that can create electricity using a chemical reaction. It converts energy stored in molecules inside the battery into electricity. They produce direct current (DC) electricity (electricity that flows in one direction, and does not switch back and forth). Using the electricity from an outlet in a house or building is cheaper and uses less energy, but a battery can provide electricity in areas that do not have electric power distribution. It is also useful for things that moved around and cords would get in the way.12V batteriesare available for the use. And current will vary. Two wheelers have 7A and four wheelers have 40A. We use a 7a battery for this demonstration purpose.

Figure:4.3 Battery 12v

4.4. Boost Converters

A fire detector is a sensor intended to distinguish and react to the nearness of a fire or fire, permitting fire detection. Reactions to a recognized fire rely upon the establishment, however, can incorporate sounding an alert, deactivating a fuel line, (for example, propane or a gaseous petrol line), and enacting a fire concealment system.

4.5 Relay

Relays are components which allow a low-power circuit to switch a relatively high current on and off, or to control signals that must be electrically isolated from the controlling circuit itself. Here is a quick rundown. To make a relay operate, you have to pass a ‘pull-in’ and ‘holding’ current (DC) through its energizing coil. And relay

Figure:4.6 Relay

4.6 BLUETOOTH MODULE HC-05

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module,designed for transparent wireless serial connection setup.The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.This serial port bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation.

Figure:4.7 Bluetooth Module Hc-05

4.7 IOT Platform

A web page is used to provide a suitable interface between the user and the Microcontroller Based Swapping Of Batteries For Electric Vehicles with health condiction monitoringz System. A particular IP address is provided for the particular industry and this IP does not change as it is hosted on Amazon Web Server. The screenshot in Figure 4.8 depicts the connecting page as seen on the user's mobile phone. The screenshot shown in Figure 4.9 is the home screen that is displayed once login is successful. This contains the different columns representing different data. This is continuously updated every second and keeps track of previous data too server..

Fig 4.8: Connect Page To The IOT

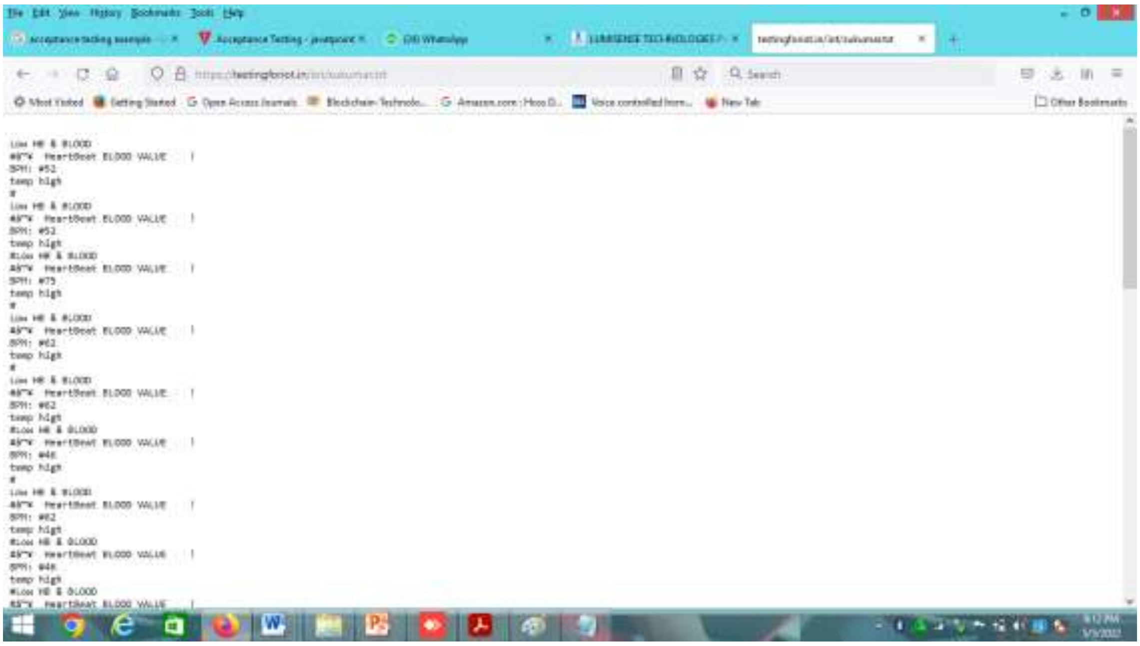

Fig 4.7. Real time IOT based industry monitoring

RESULTS

The implemented system was tested efficiently and tested for proper working. The initialization of the IOT and working of the sensors were verified. Messages were obtained after each alert and corresponding data uploaded on to the cloud storage. The buzzer and sprinkler also worked efficiently.

5. CONCUSION

A rapidly growing EV market the need for fast chargers can become the prime concern of consumers. Need for optimisation framework defining business model for swapping stations corresponding each stakeholder involved in the smart charging infrastructure, i.e. smart grid, aggregators, and xEV customers. Needs to define internet of things (IoT) paradigms shall be emerged as the supreme technology in providing utilities to intelligent transport specifically for smart charging of xEVs. This IOT system can be easily implemented with maximum reliability and high security driver health with low cost, It is a special enhancement.

FUTURE SCOPE

The system has been tested for various operating conditions and results analysed rigorously. The developed battery management system is effectively charge the batteries as well as protects the battery from overcharging and over discharging. The developed maximum power point algorithm also performed well with maximum power point tracking IOT.The based battery management system is better system for dynamo charging of battery in electric vehicle application..

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